Southern Power & Industry

The Industrial and Power Journal of the Sou[illegible]thwest

JANUARY, 1959

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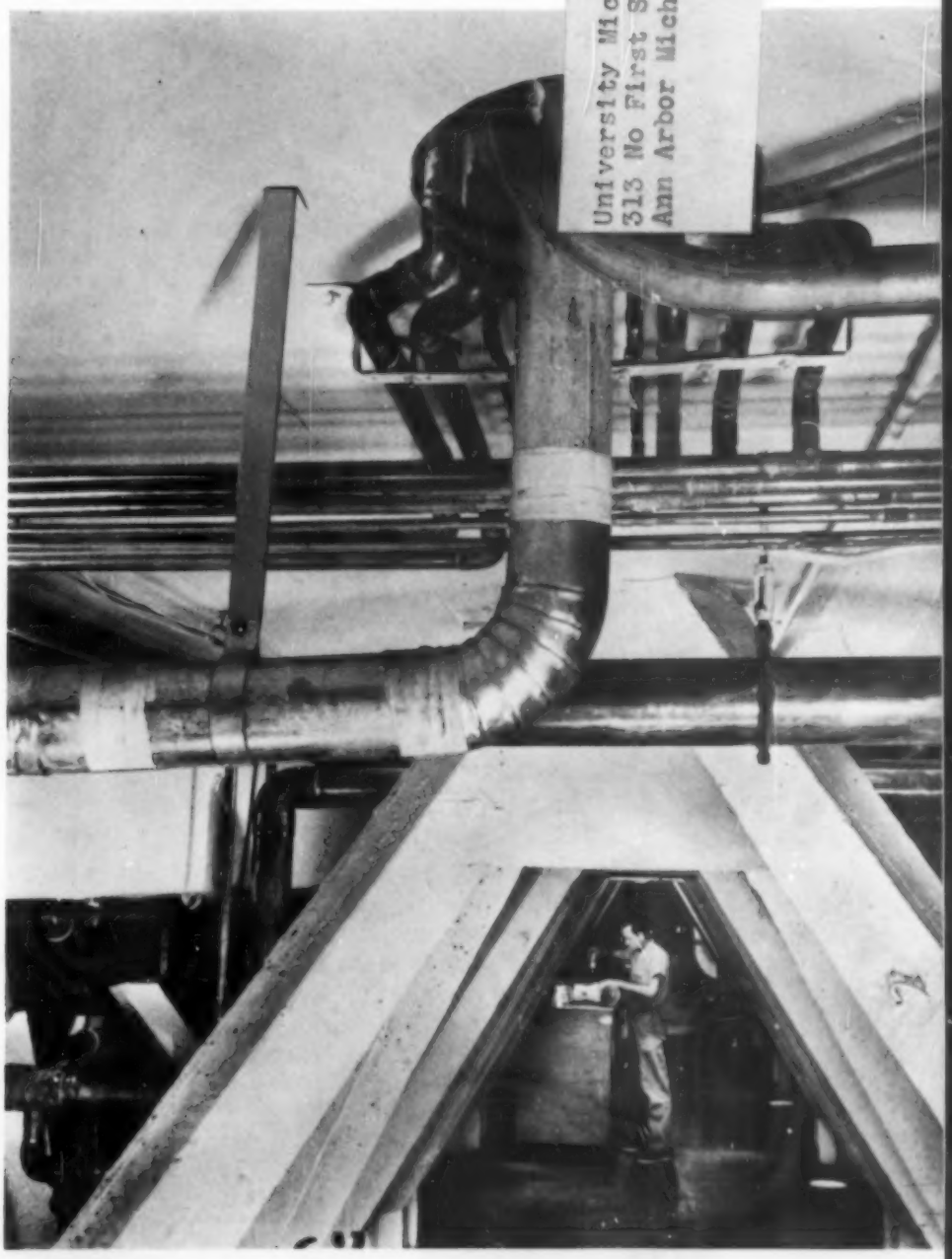
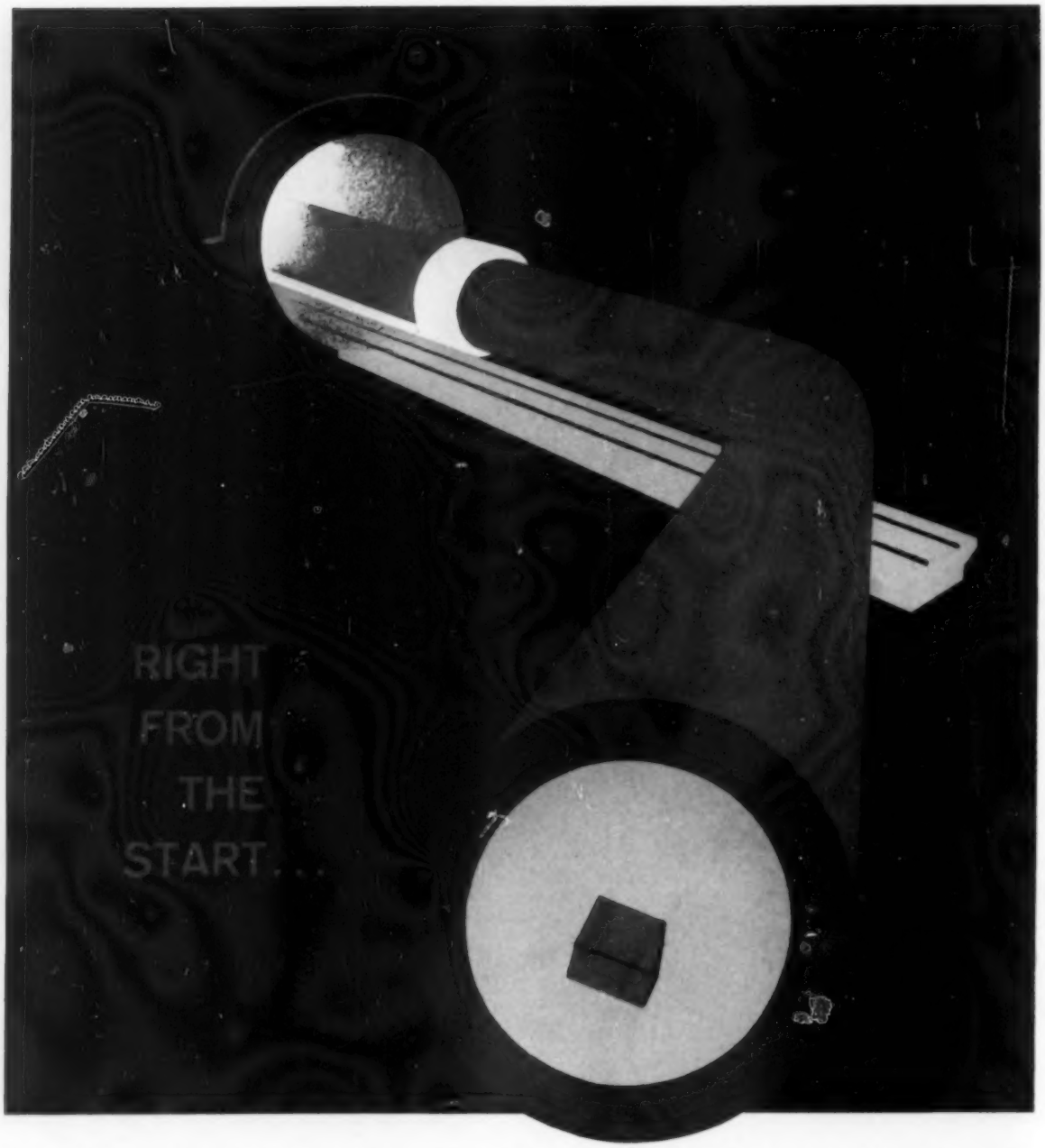
Plant Services Between Floors



Space frame service floor in Texas plant makes any utility available anywhere on either level through 3,000 access holes — see page 24.



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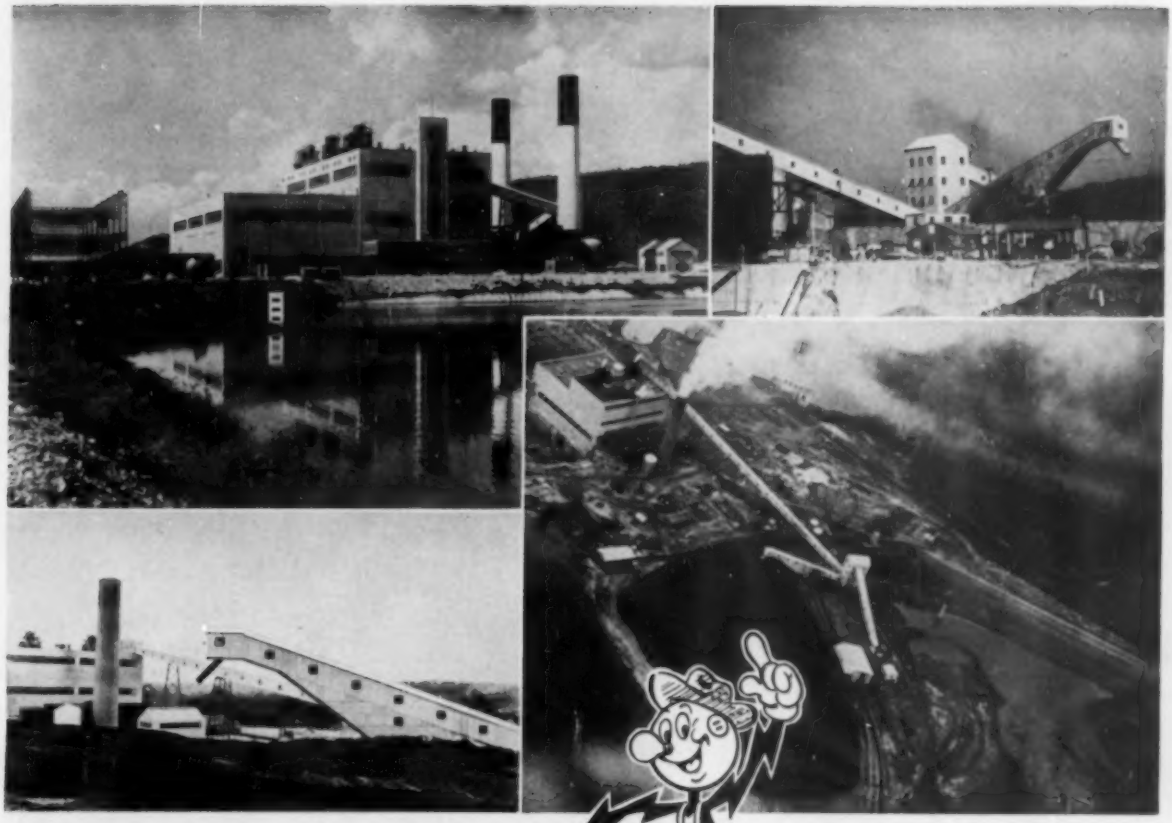
Volume 77 Number 1



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Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

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No. 1

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SPI Facts and Trends

January 2, 1959

◆ UNIQUE SPACE FRAME distributes plant services in Texas Instrument's electronic component plant in Dallas, Texas. The 9 ft high space frame service area between floors permits routing or re-routing of more than three dozen utilities with no interruption of normal production or tear-down of existing structure.

Complete availability and accessibility of any service at any point in the entire building is provided by one-foot access holes located in both upper and lower slabs — some 3,000 in all. Check pages 24-29 for details.

◆ CLEANING LARGE MOTORS? Check on the advantages of on-site use of non-flammable, non-explosive and virtually nontoxic "Freon" solvents. At du Pont's Parkersburg, W. Va. plant an enclosed 600 hp motor, used to drive a centrifugal refrigeration compressor was cleaned in one day, without dismantling, at a solvent cost of about $80. Cleaning the same motor previously cost nearly $400, including dismantling for shipment to an off-plant cleaning and service site.

◆ IMPROVED AUTOMATIC WEIGHING is paying many dividends at Tennessee Products & Chemical Corporation's Rockwood, Tennessee ferro-chrome furnace plant. Pages 38-40 describe the complete weighing and mixing operations — weighing for grinding, weighing for smelting, and over-all process control.

◆ PLANT RAILROAD TRACKAGE — If you are responsible for maintaining your plant railroad trackage, sidings, etc., get a copy of L. B. Foster's "Track Inspection Kit" (page 52). It provides an inspection check list and gives instruction on good track maintenance.

◆ "FOG" LUBRICATION SYSTEM installed on centrifugal cast soil pipe machines at the Charlotte Pipe & Foundry Co. cut oil consumption from 54 gallons per day to approximately 54 gallons per week. The Norgren Co. system is based on the use of the plant compressed air supply. Pages 36-37 describe how the system operates, safety features and production and maintenance advantages.

◆ ELECTRICAL INSULATION — Plant engineers concerned with insulation maintenance of important electrical apparatus will want a copy of "Insulation Testing by D-C Methods" — details on page 52.

◆ TRAINING PLANT PERSONNEL - Both training pools and on-the-job training were used by General Electric in their Specialty Control Department's 500 mile move from Schenectady to Waynesboro, Virginia. Pages 18-22 summarize how they trained factory workers, tailoring the program to the particular labor-market community.

(Continued on Page 8)

Reliable Allen-Bradley Control Units

for every industrial application

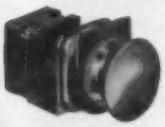
Among the many hundreds of Allen-Bradley push button and control units, you are certain to find the types best suited to your particular needs. The seven units shown below are a few of the latest additions to the Allen-Bradley *quality* line of control units.

All Allen-Bradley control units—standard duty, heavy duty, and oiltight—have double break, silver alloy contacts—to assure reliable operation. Simple constructions and generous wiring room are outstanding features. Insist on Allen-Bradley control units for *all* of your equipment—you can't go wrong!

NEW

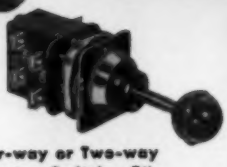
Encapsulated Pilot Light. Oiltight Bulletin 800T.

Push-to-Test Pilot Light. Oiltight Bulletin 800T.



Time Delay Push Button. Delay is adjustable from 0.5 second to 5 seconds. Oiltight Bulletin 800T.

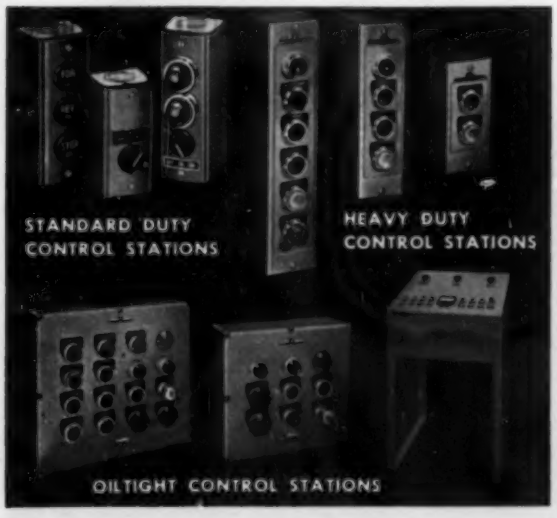
Illuminated Push Button. Combines pilot light and push button in one unit. Oiltight Bulletin 800T.



Four-way or Two-way Selector Switch. Oiltight Bulletin 800T.

Encapsulated Pilot Light. Heavy Duty Bulletin 800.

Double Circuit Push Button. Has 2 N.O. or 2 N.C. contacts. Oiltight Bulletin 800T.



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NEW ORLEANS—Robbins & Robbins, 1037 Magazine St., Tel: JAckson 2-5805
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SALT LAKE CITY—Stevens Sales Co., 1482 Major St., Tel: INgersoll 7-5489
SAN ANTONIO—Wilson Elect. Equip. Co., 101 E. Maple St., CApitol 4-2344
SAN DIEGO—James A. Satchell, 301 W. "G" St., Tel: BEImont 3-3981
SHREVEPORT—Curtis H. Stout, Inc., 334 Ricou-Brewster Bldg., Tel: 5-5485
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Facts and Trends (Continued)

◆ CONDENSERS — Looking for a simple method of calculating steam condenser performance? The new C. H. Wheeler "Condenser Handbook" can help — see page 45.

◆ "PACKAGED" NUCLEAR REACTORS in the 2,000 kw — 5,000 kw range may soon be available to industry for training and research. The Alco Products' 2,000 kw skid-mounted packaged reactor plant is based on the company's prototype Army Package Power Reactor at Fort Belvoir, Virginia. General Electric is proposing boiler water reactor plants producing 5,000 kw. Assuming quantity production, cost per G-E plant would be between $4 and $4 1/2 million.

◆ WHAT KIND OF WATER DO YOU NEED? First reaction of many engineers to this question is: "Pure water, of course!" That answer, translated into action, would mean needless expense and unnecessarily complex operating techniques in most plants.

Nalco emphasizes that really "pure" water (less than one part per million dissolved solids) is only practical in such places as very large closed-system generating stations and pressurized water nuclear power plants.

Almost everywhere else, water treated to do specific jobs, rather than being "pure" is cheaper and easier to produce, and otherwise entirely satisfactory.

◆ OLD BOILERS WERE TOO BIG at Clinton Cotton Mills in the Carolinas. The packaged boiler installation described on pages 32-33 by Master Mechanic E. P. Taylor has offered substantial operating and maintenance savings.

◆ INDUSTRIAL PAINT SYSTEMS — Complimentary reprints of PAINT SYSTEMS, the 16-page feature in SPI for November are available to Southern & Southwestern plant personnel. For your free copy just write "Paint Systems"on your Reader Service Card on page 65 and drop it in the mail.

◆ THOSE MANUALS — When it comes to our $4,000 automobile, few of us lose any time in getting it to the grease rack every 2,000 miles — just like it says in the manual. But, when it comes to a $400,000 machine tool, the manual is thrown out of the window, and every effort is made to get out of the machine every ounce of production — nonstop, 24 hours a day.

Let's not "short-change" preventive maintenance — minor tasks which only minutes can help increase machine life thousands of hours, reduce production downtime, and speed up the write-off of the machine.

◆ NEW INDUSTRIES — Eight Southern metropolitan areas (Atlanta, Birmingham, Dallas, Fort Worth, Houston, Louisville, Memphis and New Orleans) in 10 post-war years added a total of 2,507 manufacturing plants to their areas. Over 50 of these plants employ 500 or more workers.

In the 10-year period (1946-56) these eight areas added 214,578 workers to their industrial population and from 1939 to 1956 saw the value of their manufacturing output advance all the way from 438 to 1,326% among the areas.

How a portable Hoffco-Veyor saves 80% on labor costs and increases plant efficiency 20%

Profits Up—Costs Down

In today's modern plant, material handling expense frequently is an appreciable percentage of production costs—in some cases running as high as 25 to 30%. Therefore, even a 10% reduction in conveying costs will provide the equivalent of a substantial increase in sales.

Eliminates Manual Handling

Executives seeking methods to cut down on production and maintenance costs can find a relatively inexpensive solution to their handling problems in the new *award winning* Hoffco-Veyor portable conveying units. These units have trimmed costs as much as 80% and increased plant efficiency more than 20% in the brick, chemical and other manufacturing industries. Many pick up and disposal functions in manufacturing and maintenance operations formerly handled manually are now the responsibility of Hoffco-Veyors. From either a fixed location or at various points in the plant, the one-man operated Hoffco-Veyor keeps materials moving rapidly to provide substantial time, labor and product savings.

Industrial "Work Horses"

Hoffco-Veyors are extensively employed in brick, shipbuilding, foundry, petroleum, chemical and numerous other industries. Veritable "work horses" they handle a wide range of rugged duty jobs such as conveying brick chips, rock granules, gritty substances, sand, shot blast, plastic pellets, etc. In numerous manufacturing and production operations, Hoffco-Veyors meet the toughest service demands—pick up spilled materials, empty drums, clean pits and recover spent shot. For example, in a large chemical plant, a portable Hoffco-Veyor conveys catalyst pellets from reactor tanks. It is also used in trimming operations, collection of metallic chips and other tasks with these advantages:

- Rapid pneumatic loading and unloading of hoppers and containers.
- Higher production levels through reduced machine downtime.
- Easy maneuverability in crowded or virtually inaccessible areas.
- Can be hooked up to stationary piping for reaching remote areas.
- Streamlined design and compact construction assures years of dependable operation — minimum maintenance costs.
- Simple adaptor cover permits use of standard 55 gallon drums as auxiliary collectors.
- Facilitates changeovers in mixed runs, prevents mixing of materials.
- No dangerous moving parts.
- Low in first cost.
- Flexible enough for use as a vacuum cleaner — unit equipped with inlet valve to take standard size 1½ to 2 inch vacuum hose for ordinary cleaning operations when not in use as a conveyor.

a special 40 hp gas engine Hoffco-Veyor

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☐ PB 500. How Stationary Pneumatic Conveying Systems cut costs, increase plant efficiency.

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the SOUTH—SOUTHWEST

more power . . . more plants . . . more money

$38 Million High Energy Fuel Plant on Stream in Oklahoma

Tonnage quantities of HiCal — high-energy liquid fuel — will soon be produced at the new $38 million plant built by the **Callery Chemical Company** for the Navy on a 1,300 acre site near **Muskogee, Oklahoma.**

Callery Chemical (owned by Mine Safety Appliances and Gulf Oil Corporation) will operate the 500 employee plant and the high-energy liquid fuel will be used extensively in tests on various types of propulsion systems, such as turbo-jets and ram-jets. **G. F. Willard** is manager of the Muskogee plant.

Basically the plant is composed of four processing units. Although it resembles a refinery in many ways, the unusual technical requirements for producing high-energy fuel make it unique in its operating aspects. For example, the steam plant is nearly 25 times larger than the steam plant in a petroleum refinery of comparable size. This additional thermal capacity is used to bring about reactions which create compounds with higher chemical energy.

Boron is shipped to the plant as boric acid which is further processed to produce diborane, the basic building block for boron-based fuels. This is one of the steps where large amounts of thermal energy are required. In further processing the boron hydride is combined with carbon and hydrogen to produce HiCal.

One of the unique chemical engineering achievements in the processing is a liquid distillation column which is handling both solids and liquids.

Among the larger units in the plant is a $3,500,000 gas plant which produces hydrogen, carbon dioxide and nitrogen. Large quantities of nitrogen are used in the processing as a blanketing gas. The nitrogen serves as a protective atmosphere throughout the processing because many of the chemicals used in producing high-energy fuel react immediately upon contact with air.

In addition to the four processing units, the plant includes: an administration building, warehouse, shop, entrance building, laboratory, cafeteria, garage and miscellaneous service buildings.

All liquid waste from the plant's processing units is pumped into a huge storage lake where it is treated before being discharged into the Arkansas River. The lake has a capacity of 11 million gallons — nearly three-fourths the maximum daily output of Muskogee's municipal water system.

Kansas Plant — Callery Chemical's recently completed $4 million plant at Lawrence, Kansas, is now producing HiCal and several new boron compounds for industry.

MULTI-MILLION MISSILE ASSEMBLY FACILITY — S. C.

May, 1960 is the tentative completion date for the multi-million **Polaris Missile Assembly Facility** being constructed at the Naval Ammunition Depot in **Charleston, S. C.**

Work now in progress includes 12 new buildings, alterations to earth covered magazines; building of new roads, trackage, and bridges; and installation of various drainage, electrical, sewage, and steam distribution systems.

Lockwood Greene Engineers of Spartanburg have the contract for architectural and engineering work for the base.

$400,000 Shoe Factory — Mo.

With completion scheduled for March, 1959, **Juvenile Shoe Corp.** is building a new $400,000 plant in **Aurora, Missouri.** Capacity production will require about 300 persons.

Here's how Dixie Bearings, Inc. helped a customer save $2,000 in 60 days!

By removing bearing inventories from several departments to one centrally located stockroom, establishing records showing every application for every bearing, the bin number where these bearings are stocked and the quantity on hand, our engineers saved our customer money and made all bearings immediately available. Many identical bearings bought by several departments for many types of machines were found in quantities exceeding normal requirements. Many bearings were unuseable — unwrapped, dirty and rusty. A few of these bearings are shown above with one of our sales engineers who supervised cleaning, greasing and re-wrapping all bearings not in original boxes.

THE PAYOFF OF OUR SERVICE, ACCORDING TO OUR CUSTOMER, WAS A SAVING ON BEARING PURCHASES OF $2,000 IN LESS THAN TWO MONTHS.

This is not an isolated example of our services — surveys of bearing requirements, inventory control, application engineering, maintenance schedules and procedures are a regular and continuing part of our service to all customers to whom we supply replacement bearings. Ask how we can help YOU!

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NEW YORK: Buffalo, Bolanrol Corp. • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

News of the South-Southwest — more power . . . more plants . . . more money

Fairmont Foods – Okla.

The Lawton, Oklahoma branch plant of **Fairmont Foods Company** is being extensively remodeled. In addition to new refrigerated storage space, new bottling room and automated handling facilities, plans call for a new 100 x 130 ft brick building. Completion is scheduled for June of '59.

$6 Million Expansion Underway for Halifax

Paper mill improvements, including a new paper machine, are underway at **Halifax Paper Company, Inc.**, Roanoke Rapids, North Carolina. The design and construction of this $6,000,000 expansion program is being performed by The Rust Engineering Company.

$1 Million Florida "Gas Concrete" Plant

A new Tampa, Florida industry, **American Durox Corp.**, has been announced by **Karl Lagnefors**, company president. The plant will manufacture "Gas Concrete" in a 55,000 sq ft, $1,100,000 facility located on 15 acres northwest of Tampa.

Construction of office facilities at the site is underway and will include a Research Institute for training of chemists in the rather complex manufacturing process. Construction of the plant itself should begin early in 1959. When in full operation, it will employ 100 persons.

"Gas Concrete" is a formed concrete nearly six times lighter than ordinary concrete but strong enough for use as building blocks and slabs. The unique product may be produced in any size, such as brick, block, plate or reinforced slabs, and may be sawn, drilled or chipped.

American Durox Corp. will manufacture "Gas Concrete" under a Swedish patent and holds the franchises for five southern states. Similar plants have been announced in Los Angeles, St. Paul, Kansas City and a plant is in production in Denver, Colorado. This corporation is the first in the United States to produce Durox.

Dixie Tube & Steel to Build in Dothan, Ala.

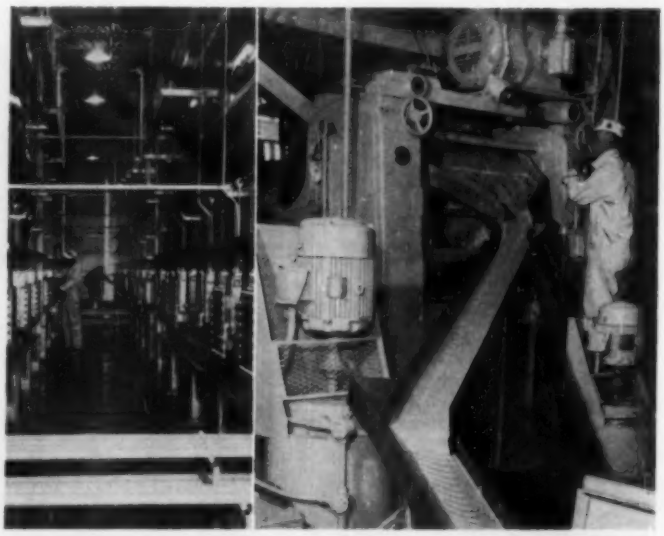
$75,000 building will be constructed for **Dixie Tube & Steel Co.** which will utilize machinery valued at $250,000 and which will produce about 1,500,000 ft of steel and tubing annually. The Dothan, Ala. operation will provide 20,000 sq ft of working space and will employ 35-50 persons.

$4 MILLION TEXAS PLANT OPENED BY SHERWIN-WILLIAMS

Production is underway in the $4,000,000 Garland-Dallas Sherwin-Williams paint, varnish and lacquer plant located on a 25 acre site in **Garland, Texas. Willis R. Currens** is general superintendent of the new plant which replaces the company's factory in Dallas.

The facilities include ten buildings and three tank farms. A 4-story main structure, containing 50,000 sq ft of floor area, houses paint manufacturing facilities. It is flanked on one side by a 40,000 sq ft raw materials warehouse and on the other by a 120,000 sq ft finished goods warehouse — both designed for high piling of palletized loads. In front of and connected with the paint plant is the office and laboratory building. Behind the plant is the varnish production unit. Beside it are the varnish and lacquer laboratory and lacquer blending plant. The buildings contain over 250,000 sq ft of floor space altogether.

Approximately 7,000,000 gallons of paint products will be produced in the plant annually, including trade sales, industrial, automotive, transportation, graphic arts and industrial maintenance finishes. Customers of the pigment, color and chemical division of the company will also be served from the plant.



Storage tanks for some 350,000 gallons of varnishes and processed liquids fill the 4th floor. Complex system of piping and hoses conducts stored materials to points of use in the plant. Typical roller mill installation is shown in right photo. Note portable trough arrangement which permits filling any one of a number of batch tanks (below floor level) from each mill.

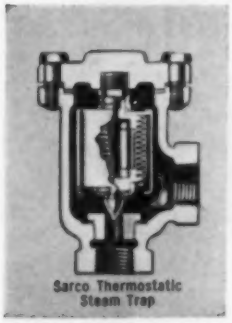
Officials in the plant include: **Ross D. McLarty**, superintendent of paint manufacturing; **Otto K. Sieplein**, technical director of the laboratory; **Harvey L. Piepho**, director of varnish production; and **Willis R. Currens**, general superintendent.

Sarco Type 21 Self-Powered Temperature Regulator

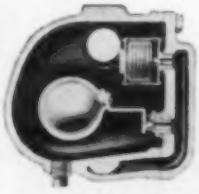
Sarco Type 24-30 Self-Powered Pilot Operated Temperature Regulator

Sarco Type LSI Electric Indicating Temperature Controller

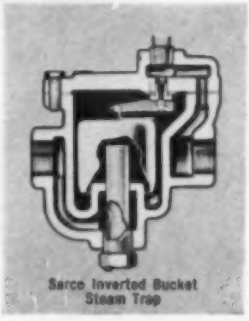
Sarco Thermo-Dynamic Steam Trap



Sarco Thermostatic Steam Trap

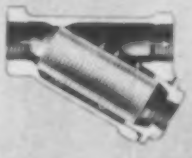


Sarco Float-Thermostatic Steam Trap



Sarco Inverted Bucket Steam Trap

Sarco Liquid Expansion Steam Trap



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Houston, Atlanta and Dallas Set Fast Pace in Metropolitan Area Development

Eight Southern metropolitan areas — **Atlanta, Birmingham, Dallas, Fort Worth, Houston, Louisville, Memphis** and **New Orleans** — in 10 post-war years added a total of 2,507 manufacturing plants to their areas to keep pace with their production potentials. Among the plants were 57 employing 500 or more workers.

In the 10-year period (1946-1956), these eight areas added 214,578 workers to their industrial population and from 1939 to 1956 saw the value of their manufacturing output advance all the way from 438 to 1,326% among the areas. Statistics are based on a recent report of the U. S. Bureau of the Census.

Houston, Atlanta and **Dallas** were among the top twelve metropolitan areas in the country distinguishing themselves for their ability to attract new manufacturing industries. Houston was 7th from the top among 35 of the nation's largest areas in increase in number of plants between 1946 and 1956, Atlanta was 8th, and Dallas was 11th.

Conoco Expanding in Ponca City, Okla.

A $750,000 modernization and expansion program is underway at **Continental Oil Company's** oil products compounding and packaging plant in **Ponca City, Oklahoma.** Program includes a new warehouse, automatic blender and homogenizer and other automatic handling and palletizing equipment. Completion is scheduled for the fall of 1959. **C. D. Hull** is Conoco refinery manager in Ponca City.

$500,000 Expansion of La. Gas Extraction

The Fluor Corporation, Ltd. has been awarded a contract of approximately $500,000 to modify and expand the **Eunice, Louisiana** gasoline extraction plant owned jointly by Runnels Gas Products Corporation (a wholly-owned subsidiary of Union Oil and Gas Corporation) and Texas Gas Exploration Corporation.

Fluor's Mid-Continent Division at Houston, Texas also engineered and recently completed construction of the original plant.

When completed in April, 1959, the plant will process another 69 million cubic feet per day of natural gas for extracting natural gasoline, commercial butane and propane, bringing its total capacity to 369 million cubic feet per day.

Humble Expanding Texas Operations

Humble Oil & Refining Co. of Houston, Texas is building a new polypropylene plant at **Baytown, Texas.** Operation is scheduled for late '59 with a capacity of 40 million lb a year. Polypropylene is relatively new versatile petrochemical plastic made from refinery propylene gases. It is well suited to the manufacture of plastic bottles, containers, plastic pipe, upholstery fabrics, etc.

Humble has also announced preliminary plans to expand its gas operations in Southwest Texas with the construction of a gas processing and cycling plant for Kleberg County, adjacent to the company's present Seeligson Compressor Plant. The new facility will be known as the **King Ranch Gas Plant.** An extensive pipeline gathering system and transmission line are included in the expansion, which is expected to cost approximately $75 million.

Plant construction is expected to begin in the late spring of 1959 with completion anticipated in 1959 of the entire program.

New Facilities for Armour in Houston

Plans are underway for construction of a meat processing and distribution facility on a 25 acre tract in the North Houston Industries development in Houston, Tex. for **Armour & Co.**

Construction is expected to begin in the spring on the facilities which will include a building for processing operations and offices, an abattoir, and a service building — tentatively planned to house the power plant and employees' dressing rooms.

The operation will be under the supervision of **John B. Teel,** Armour District Manager, with headquarters at Fort Worth.

Aeroquip Expands Dallas Operations

Aeroquip Corporation, Jackson, Michigan, producer of flexible hose assemblies, fittings, couplings, etc., has expanded their Dallas, Texas facilities to serve both industrial and aircraft markets.

10,000 sq ft expansion includes facilities for assembly, proof test and inspection of hose assemblies.

Manager of the Aeroquip plant at 9105 Sovereign Row, Box 35463, Dallas, Texas, is **Clyde Stratton.** Aircraft operations are under the direction of **Roger Leuba.**

Alcoa — Tennessee

Aluminum Company of America has announced plans to build a new facility for the production of roller-coated aluminum sheet in widths exceeding any previously available in this product.

The unit, to be constructed adjacent to the company's huge North Plant sheet mill at **Alcoa, Tenn.,** will produce aluminum alloy sheet and coils, with baked enamel finishes, in widths exceeding 60 in.

THE CITY THAT DIDN'T EXIST A MONTH AGO

Every 30 days the U. S. adds as many new Americans as live in Norfolk, Va.—creating brand-new wants and needs which must be satisfied.

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6. **More research** . . . *$10 billion* spent each year will pay off in more jobs, better living, whole new industries.
7. **More needs** . . . In the next few years we will need *$500 billion* worth of schools, highways, homes, durable equipment. Meeting these needs will create new opportunities for everyone.

Add them up and you have the makings of another big upswing. Wise planners, builders and buyers will act *now* to get ready for it.

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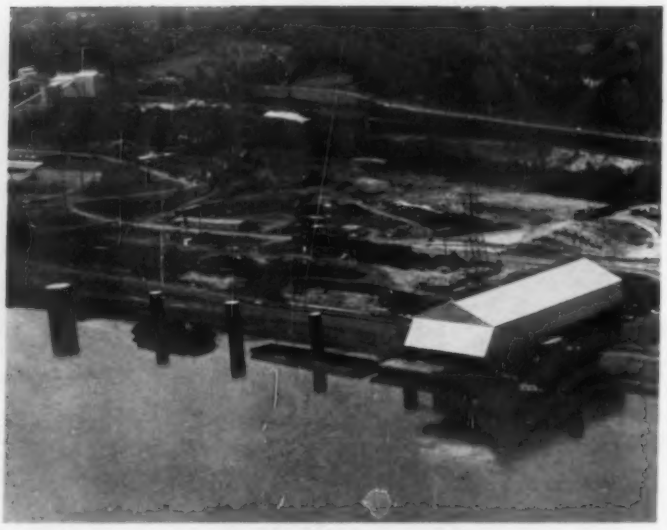
(This space contributed as a public service by this magazine.)



ASHLAND, KENTUCKY — This new $1½ million river terminal, recently opened at **Armco Steel Corporation's** Ashland, Kentucky Works, is designed to handle the hot and cold rolled steel sheets and coils and special coated steels produced by the Ashland Works and to receive many raw materials consumed by the plant. Building has facilities for both trucks and railroad cars. Design and erection were under the supervision of the Ashland Works engineering department.

Faultless Rubber Opens $1 Million Carolina Plant

Employing over 150 people, **Faultless Rubber Company's** new $1 million **Spartanburg, S. C.** plant is now producing a new line of polyurethene products which will be used for cushioning for upholstery, etc. It will also produce plastic toy balls and items employing rubberized cotton textiles. **T. W. Miller, Jr.** is President of Faultless Rubber Company. Daniel Construction of Greenville, S. C. designed and constructed the 40,000 sq ft plant.

Converting Plant for Albany, Ga.

Sutherland Paper Company is building a 175,000 sq ft, $1,500,000 converting plant in Albany, Georgia. Initial production will be the manufacture of paper cups, paper plates, pre-packing meat and produce trays. Production of paraffine and folding dry cartons is expected at a later date.

Upon completion early in 1959, **Robert Brockenridge** will be General Manager; **E. Neele Stuart,** Office Manager; and **P. Howard Shikoski,** Specialty Production Supervisor.

PLANT PERSONNEL

Emil J. Docekal has been promoted to plant engineer at Lockheed's Georgia Division at Marietta, Georgia. He replaces **Leslie D. Myers,** who has been promoted to chief manufacturing engineer of Lockheed's Missile Systems Division, Sunnyvale, California.

Earl S. Moak has been appointed Paper Mill Superintendent of Marathon Southern Corp. in Naheola, Ala. **John R. Fulkerson** replaces Mr. Moak as Assistant Paper Mill Superintendent.

John E. Wilbanks is now superintendent of steelmaking at the West Virginia Works, **Connors Steel Div.,** according to **Astor I. Thurman,** manager of the West Virginia Works. Mr. Wilbanks joined Connors after 23 years with Atlantic Steel in Atlanta, Georgia, where he was melting superintendent.

Wallace P. Dunlap, Jr. is now production superintendent of **Mobay Chemical Company's** new **Martinsville, West Virginia** plant. He replaces **Richard Cassidy,** now assistant to the plant manager of Monsanto's Illinois plant.

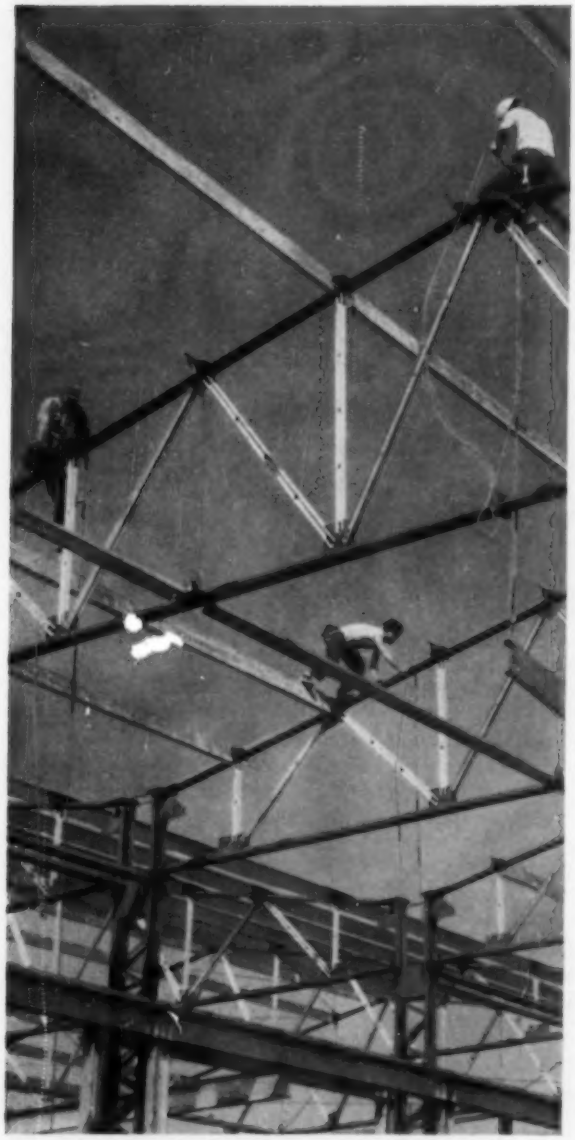
Miami Window Corp. is adding 15,000 sq ft to its new Scroll, Inc. aluminum furniture plant at **Miami, Florida** and 50,000 sq ft to its **Meridian, Mississippi** window manufacturing plant.

Jackson Brewing Company is underway on an $800,000 modernization and expansion of the bottle, can and packaging division of its **New Orleans, Louisiana** brewery.

Construction of the new **Dow Badische Chemical Company** plant at **Freeport, Texas** is now underway with completion scheduled for late '59. Engineering work is being handled by Dow. New facility, adjacent to Dow's Plant B will make products derived from acetylene. **E. B. Barnes,** Dow Texas Division director of organic research is president of the new company.

Hooker Chemical Corporation is substantially expanding dicalcium phosphate production at its **Columbia, Tennessee** plant where the company operates two electric furnaces producing phosphorus from its own phosphate rock reserves. Enlarged facilities are expected to be in operation by April, 1959.

Here's The Way To Save
BUILDING DOLLARS



Workmen assemble strong, lightweight roof structure of a big Truss-Type Armco Steel Building. Their work demonstrates three prime advantages of building the Armco Way.

FIRST, in the design stage, you gain the economies and convenience of pre-engineered, tested structurals as well as covering materials. Clear spans range to 100 feet, with wall and roof load designs specifically tailored for your area.

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Waynesboro, Virginia . . .

TRAINING for a New Plant

By H. M. HOWELL

Mr. Howell is a Specialist — Employee Relations,
Specialty Control Dept., General Electric Co., Waynesboro, Virginia

BOTH training pools and on-the-job training were used by General Electric in their Specialty Control Department's 500 mile move from Schenectady to Waynesboro, Virginia. SPI for December (pages 38-40) highlighted the moving procedures and summarized how we trained our draftsmen.

Long before we hired our first factory hourly worker, we were well aware of the scope of our training needs. We had decided that all hourly employees would be hired locally. Yet, we did not want to harm our new community by taking away from other businesses the limited number of qualified people available in the local market. Thus, our only alternative was to start from scratch and train — and our factory training needs became nearly 100%.

Very few of the people in the local labor market were familiar with our type of work and none at all were familiar with our products. Although the specific skills we required were not plentiful, there were ample people of sound character, who were trainable, and who were willing to learn and work hard. We knew that before we could make quality products at competitive prices and deliver them on schedule, we would first have to mold this fine raw material into an efficient work force.

HOW GENERAL ELECTRIC trained factory workers for their new Virginia specialty controls plant . . . the apprentice program . . . when special group training is economically sound . . . tailoring program to the particular labor-market community.

On-the-Job Program

By the very nature of our situation (a newly organized department in the process of moving to a new community, and transferring only professional employees) every one of our employees who had people reporting to him had to be a trainer and teacher — including the General Manager — for most of us were new in our jobs. This was particularly true in Manufacturing where 20 of the 30 supervisors and specialists being transferred or appointed upon arrival had never been in jobs of equivalent responsibility before. They were chosen not so much for past experience as for adaptability and their ability to train others.

With the large number of factory jobs involved, a broad plan had to be agreed upon regarding training methods and how the Department time and money could

Control room at Shippingport Atomic Power Station. Bailey Instruments for the primary system and Bailey Instruments and Controls for the steam system are located on this control panel.

Bailey pioneers the control of . . .

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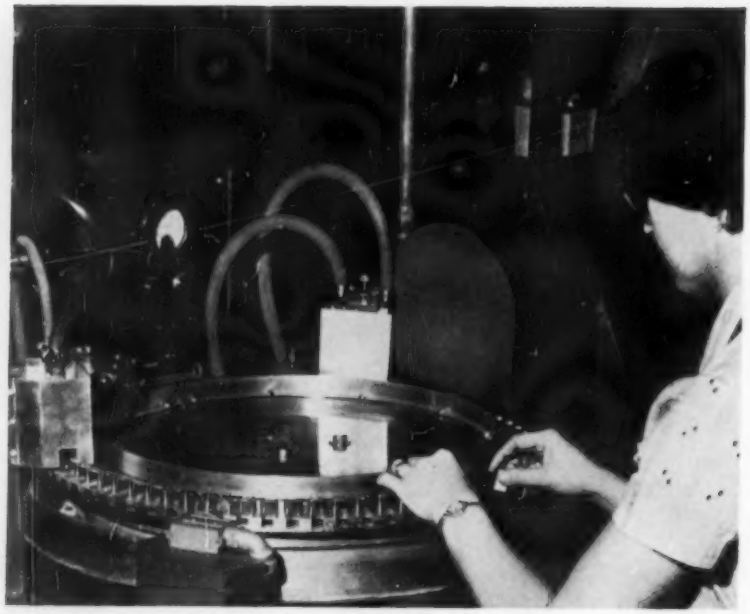

After only one week of basic instruction and non-productive practice, the assembly and wiring trainees performed production work. Here is Marion Clark operating an automatic induction soldering unit.

best be utilized. It was decided that for the more specialized work involving relatively small numbers of people, training would best be accomplished on-the-job.

This was done in many factory functions such as the Sheet Metal Shop, Machine Room, Plating Room, Testing Area, Stockroom, and Shipping Area.

Each foreman was fully responsible for training his own people. During the early days of hiring, this also included participation in the selection process. The foreman assisted the employment specialists in selection, by reviewing the applications of candidates to find those most suited for his type of work. He would select those to be interviewed, interview them, and then recommend candidates for final selection. If a candidate met the other employment criteria (physical condition, reference checks, employment tests, age, residence location, and education), the foreman's recommendation resulted in his employment.

In some instances this on-the-job training was extremely intensive. For example, in the Sheet Metal Shop, each new employee (in nearly every case a high school graduate with some previous related work experience) was rotated from one type of sheet metal assignment to another, until he had acquired a basic knowledge of every machine.

The first assignment was usually shearing or piercing. After this, the sequence of assignments varied, but eventually included resistance welding, forming, assembly and arc welding, drilling and tapping, light metal fabrication, etc., until the full course of assignments had been covered, and the trainee had become a well-rounded Sheet Metal Fabricator. Familiarity with, and use of, sheet metal drawings at all stages of this training, was required.

Training Center

An entirely different situation existed with respect to those occupations described generally as wiring and assembly. There were four significant considerations pertaining to this type of work:

1. **Priority:** According to the schedule of our move to Waynesboro, the assembly and wiring work was to be transferred first. Therefore, the first job openings to be filled were to be of this type.

2. **Numbers:** The assembly and wiring occupations were expected to require more people than any other type of factory work.

3. **Learning Time:** The more simple phases of this work were considered semi-skilled in nature. It was expected that individual jobs could be learned within a relatively short time.

4. **Basic Skills:** This type of work involved basic skills that might be used in many different types of products or product lines.

From these four considerations, it was decided that during the initial hiring period, a Training Center would be established to teach the basic assembly and wiring skills and their application to Specialty Control products.

As the result of preliminary interviews and the more intensive selection procedure following them during the first week of September, 1954, a group of 10 girls was selected to start in the Training Center. The goal was to obtain reliable, loyal employees who were trainable and who seemed to have special aptitude for learning assembly and wiring work.

This first group of 10 girls reported for work on the morning of September 13, 1954. Keep in mind that the first steel column for the plant had been set only four months previously. The building was still under the jurisdiction of the building contractor and construction was in full progress on all sides. A small area had been cleared for the Training Center and temporary partitions of wallboard or canvas had been erected. Portable space heaters had been provided since the heating construction had not yet been completed. Assembly benches had been set up and power temporarily wired in, where required for testing purposes.

It was explained to the new employees that there would be much noise, that there was no permanent heat in the building, and that there would be other inconveniences connected with working in a building that was

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(Mailing address)
Name _____
P. O. Box or
Street and No. _____
City _____ State _____

Classification data—If an individual, give name of firm connected with and title of position.

Firm _____ Position _____
Products manufactured
or nature of business _____

◆ Both training pools and on-the-job training were used by General Electric in their Specialty Control Dept. 500 mile move from Schenectady to Waynesboro, Virginia.

not yet built. It was stressed that safety was particularly important in such circumstances and that every effort would be made to provide for safe working conditions and that they must obey all safety regulations. The normal safety rules were explained and also the special construction hazard rules. In addition, they were told that as the construction work proceeded, every effort would be made to provide for their working comfort.

The training staff consisted of three supervisors; one responsible for basic training and the others for training on specific types of products. The first day was spent primarily on Company and Department orientation. Following this first day and continuing for approximately one week, the entire time was spent on elemental mechanical and wiring information.

It was particularly important to overcome fear, stimulate confidence, and instill interest and enthusiasm for the job and the work. These people were really pioneers or "charter members," and we reminded them of this at every opportunity. At the same time we brought in additional space heaters and did other things to improve the "frontier type" working conditions as soon as the progress of the building construction permitted it.

From the very first day, the importance of a quality product was stressed and this was emphasized throughout the entire training program.

One of the first steps in training was a very simple approach to tools and products. The early part of this was simple identification. The instructor explained in advance to the employees that this portion of their training was to familiarize them with the names and functions of the tools they would be using, and the special language associated with the products they would be making. These new and inexperienced women employees were very conscientious about all of this, and were anxious to learn quickly, and to perform well on the written and oral tests covering this information.

Further instruction was given in simple mechanical assembly and wiring until the processes and mechanical rudiments, such as soldering, were understood.

After one week of orientation and basic training, the instructor counselled with each employee regarding her progress and made constructive suggestions for improvement. The new employees were then assigned to one of the two other instructors who started them on assembly and wiring of actual products. They continued on this actual production work, still in training, and under close supervision, until their assignment to a regular occupation. The first products assembled at Waynesboro (from parts sent from Schenectady) were shipped from the plant on September 30, 1954, just 14 working days after the first group of trainees reported for work.

After only one week of basic instruction and non-productive "practice," the assembly and wiring trainees performed production work; that is, work that was required for shipment to customers. The rudiments and terminology of soldering, wiring, and use of small tools in light assembly continued to be taught by the instructor, but in relation to specific products to be shipped. Once the brief work orientation and practice period was over, we stressed to our new employees that although they were in training, they were not just practicing, but that they were learning by doing useful work, making needed products which would be paid for by customers.

A second group of nine employees started training about one month after the first group had started, and a third group of seven entered training in another month. By the middle of November, there were three groups in three broad degrees of training, all physically located in the Training Center.

By mid-December, there were approximately 40 employees in training. By the end of December, enough work had been transferred from Schenectady so that some openings had developed for regular jobs and employees in training were ready for assignment to these jobs. From that point on the number of people leaving the Training Center was roughly equivalent to the number entering, so that the maximum number there at any one time was about forty.

The two instructors responsible for production training judged the progress of trainees by noting their performance against estimated normal time required to perform the work under standard conditions. It was recognized that conditions were not standard, and that conclusions drawn as to individual progress could only be tentative.

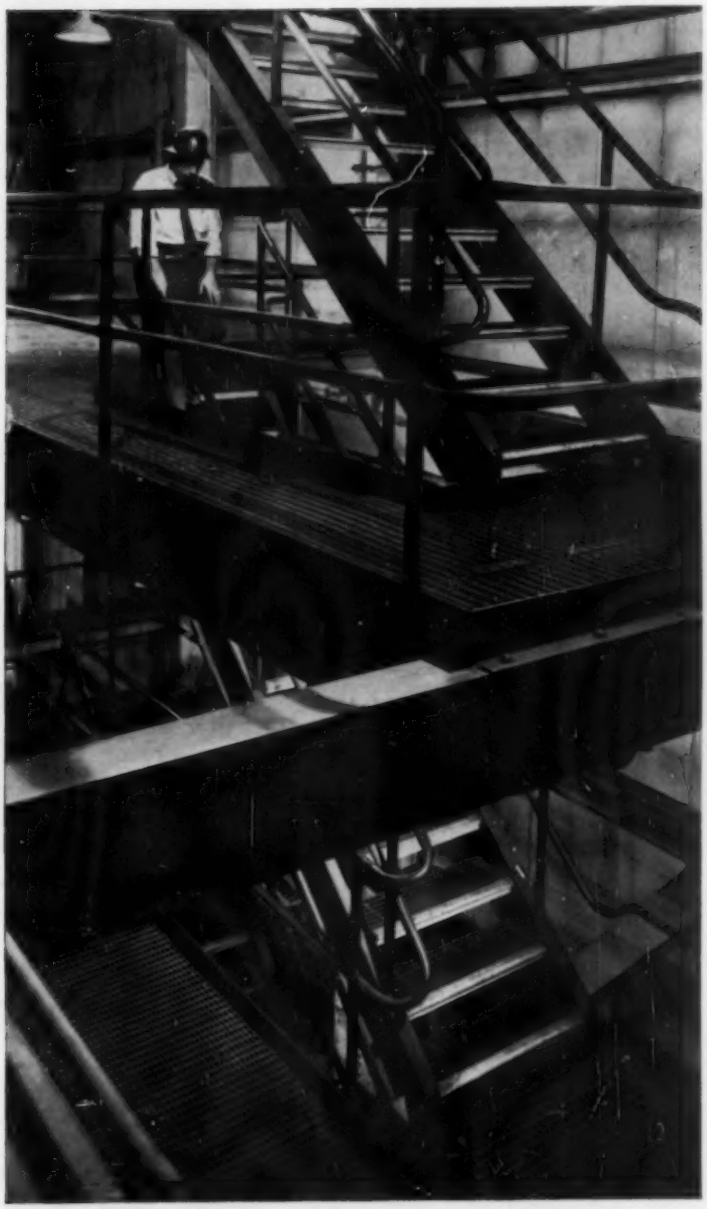
Some of the trainees were obviously better adapted to testing and inspection work than to actual assembly and wiring. These individuals were promptly transferred to testing and inspection assignments as job openings developed. In a few instances persons found unsuited to factory work were entirely acceptable for certain kinds of office work, and were accordingly transferred to such positions as they developed.

The method for promotion of

(*Continued on page* 80)

COMING IN FEBRUARY — The follow-up training procedures summarizing under what circumstances special group training programs should be undertaken and at what point should they be discontinued.

Where a misstep costs $500... Blaw-Knox Electroforged® Steel Grating provides safer non-slip footing



Stair falls cost industry over $60,000,000 a year.

An average accident amounts to a loss of $500 in claims.*

A good way to guard against these profit-eating accidents is to construct your stair treads, walkways and floors with Blaw-Knox Electroforged Steel Grating. Non-slip twisted crossbars and a wide variety of bearing bars are available to meet every kind of working condition—safely solving the most hazardous skid situations.

Rigid, one-piece construction makes installation easy. Once on the job, Blaw-Knox grating practically takes care of itself. There is nothing to wear, nothing to patch, no dirt collecting corners to clean. It goes anywhere, fitting neatly around pipes, beams and machinery, admitting plenty of light and air to the area.

Made to your specifications, Blaw-Knox grating provides new highs in safety, easy up-keep and flexible application. For new ideas about grating—including space saving platforms and shelving, write for Bulletin 2527.

*Based on a study analyzing 803 compensable work injury claims closed in Illinois involving stairs and steps.

BLAW-KNOX

BLAW-KNOX COMPANY

Equipment Division
Dept. K, Pittsburgh 38, Pennsylvania

Texas Instruments Incorporated . . .

Unique SPACE FRAME

ONE OF THE most outstanding manufacturing plants in the world, Texas Instruments' new 7¼ acre electronic component plant in Dallas has been in production for over a year.

Its space and services anticipate change; entire production areas can be revamped almost overnight to accommodate increasing volume — or produce an entirely new product. Adaptability to future demands is equally unique.

The modern plant, first of several structures on a 300 acre site, contains the latest facilities and equipment for the manufacture of semiconductor devices and miniature electronic components — precision transistors, diodes, rectifiers, resistors and tantalum capacitors.

The building incorporates two architectural shapes unique to industry — hyperbolic paraboloids and space frame structure.

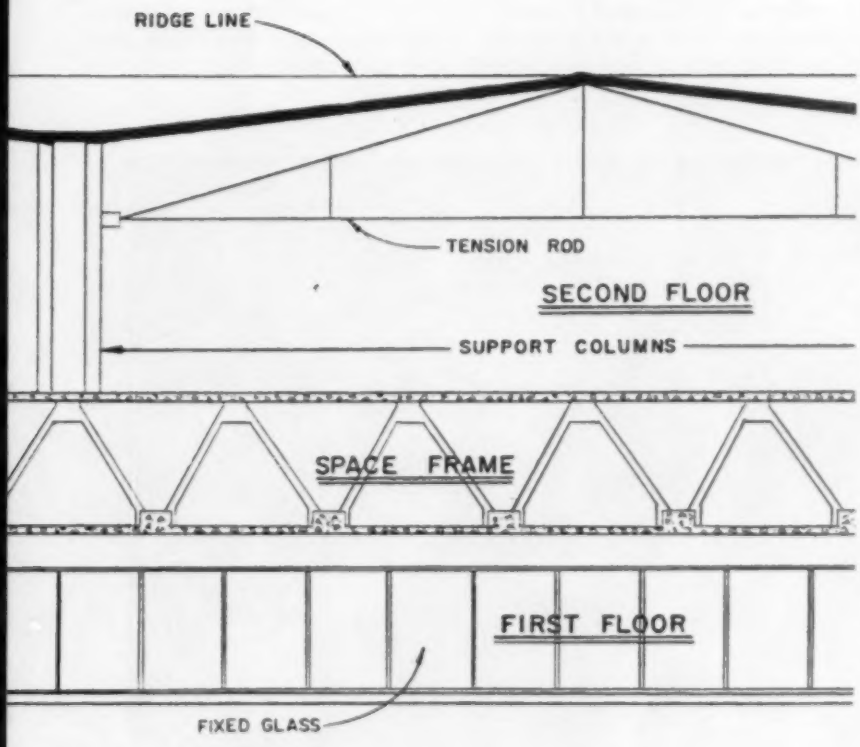
Umbrella-like concrete roof shells, cast in place and fitted together in a cellular pattern, resulted in a quickly erected and readily expanded building. The three-dimensional space-frame construction (a "between-floors basement") is revolutionary to the distribution and servicing of a precision manufacturing plant's complex and variable utilities.

The plant contains 310,000 sq ft of usable productive floor space. In addition, there is approximately 131,000 sq ft in the Space Frame, which is used for the distribution of all services required in the operation of a modern electronics plant.

The building is of concrete construction with an exterior facing of window walls on the First Floor, anodized aluminum insulated panels on the Space Frame Floor, and white Georgian marble on the Second Floor.

Roofing — The roof structure over each unitized bay in the building is a lightweight concrete shell formed of four hyperbolic paraboloid sections varying in thickness from 3- to 5-in. and spanning 60'6". The 2'6" space between the shells is filled with an Insulrock acoustic board which not only serves as a sound absorbent but also as an expansion joint

Distributes Plant Services



◆ Nine-foot-high space frame service area between floors permits routing or re-routing of more than three dozen utilities with no interruption of normal production or tear-down of existing structure.

◆ Complete availability and accessibility of any service at any point in the entire building is provided by one-foot access holes located in both upper and lower slabs — some 3,000 in all.

By FRED J. SNYDER

Mr. Snyder is Senior Industrial Engineer, Supervisor of Plant Layout and Facilities Planning, Semiconductor-Components Div., Texas Instruments Incorporated, Dallas, Texas.

between the shells.

Roofing is a 20-year bonded four-ply asphalt and gravel roof with additional coating of cement plastic reflective surface. Prior to the installation of the four-ply asphalt felt, 1½-in. of rigid insulation was applied in three layers at ½-in. per layer. Each layer of insulation has a uniform coating of steep asphalt and the four-ply felt has been applied on top of the rigid insulation. Inert particles at the rate of 75 lb per square were applied and imbedded in the asphalt over the final layer of felt. The exposed surface of the roof is the layer of white cement plastic material into which was imbedded a uniform coating of marble chips.

The first floor of the building (84,000 sq ft) houses the administrative offices, engineering offices and engineering laboratories.

The second floor is the manufacturing area and houses all equipment required in the manufacture of semiconductor devices and electronic components. Floor loading of the manufacturing floor is designed at 200 lb/sq ft.

Located on this floor is a sealed-off area of 60,000 sq ft designated as the ultra pure "Snow White Area." This houses the area required for the growing of materials used in the manufacture of transistors, diodes, and rectifiers and also houses the area required for the assembly of these devices. Employees in the Snow White Area wear lint free Dacron clothing and work in an atmosphere that is air conditioned, dirt free and controlled to 20% relative humidity.

Cafeteria and Kitchen facilities, which occupy 13,200 sq ft are located in the south end of the First Floor.

Air Conditioning — All office, manufacturing and service areas are air conditioned for all seasons and this conditioned air is distributed thru the use of (106) 4000 cfm Trane air handling units located in the Space Frame. The air conditioning equipment — boiler, heat exchangers, refrigeration compressors, electrostatic filters — supplying conditioned air to

these air handling units is located in the Mechanical Equipment room.

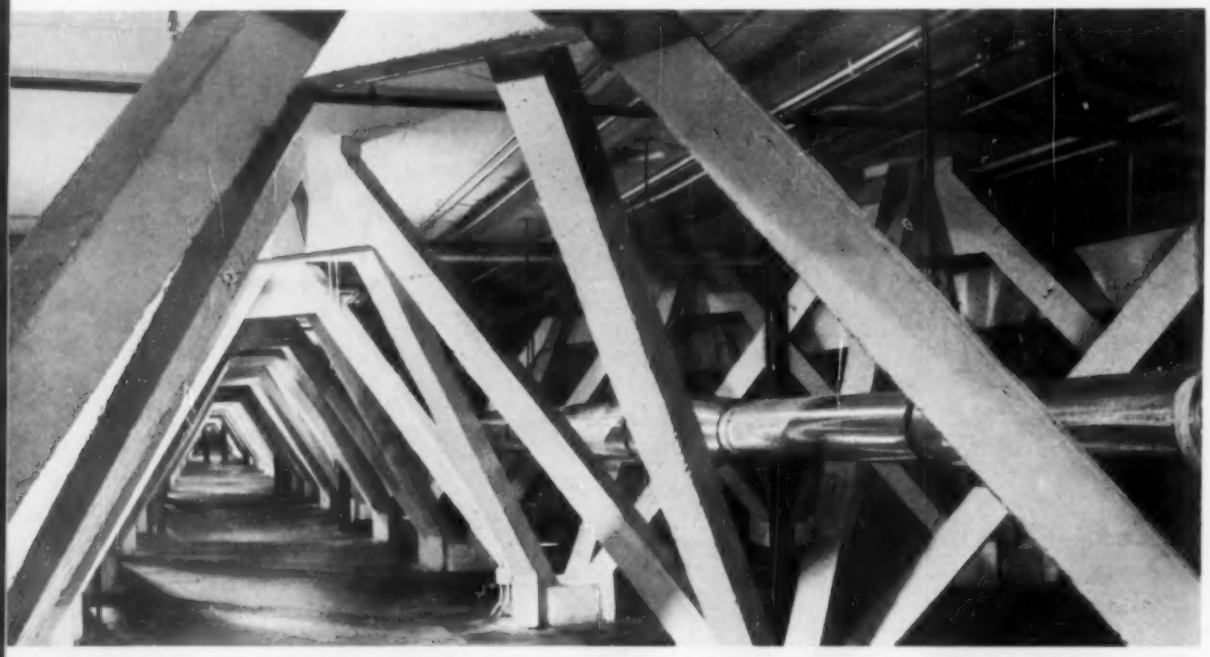
In addition to the air conditioning equipment, this two story Mechanical Equipment room also contains electrical power distribution stations and is the central location for the entrance of all outside utilities.

The compressors for the refrigeration system are three 400-ton Trane "Hermetic Centravac" water chillers. Space in the room is provided for the addition of a fourth unit should the building load be increased. Each compressor is equipped with a capacity control system which permits continuous variable loading from 10 to 100%. This control system automatically stops the unit when its load falls below 10%. The refrigeration system circulates 3,600 gallons of condensed water, entering at 85 F and leaving at 95 F, with the chilled water leaving at 42 F.

The complete air conditioning system is a dual pipe system and is so designed that heating and/or cooling of adjacent individual bay areas can be accomplished simultaneously. Chilled water from the chillers is piped to the 106 Trane air handling units. These units include a filter section, cooling coil section, re-heat coil section and a fan section. Hot water supply to the water coils in the air handling units is provided by a hot water boiler having a rating of 150 hp and capable of generating 5,021,000 Btu/hr continuously. This boiler has a modulating gas firing system.

Air Distribution — Two separate air distribution systems supply air to the building. All outside and return air used in the sealed off Snow White section of the building is dehumidified and filtered prior to being ducted to the air handling units for additional filtering, heating or cooling. Dehumidification of the air is thru the use of the Niagara Controlled Humidity Method with Hygrol liquid. Primary air filtering is thru an electrostatic air filtering system using American Air Filter's Conglomerator Precipitator with Rollamatic filtering media.

Conditioned air for the manufacturing floor is distributed from the air handling units thru the supporting columns of the Second Floor. The system is a high velocity air distribution system; and from the columns the air is directed thru grilles against the hyperbolic paraboloid shell. This results in equal air dispersion over each individual bay area. Air return is thru grated openings in the floor to the Space Frame area. This Space Frame area also serves



Three-dimensional space-frames — a most important and unusual construction technique — provide a nine-foot access space, or service floor, between the first and second floors. It acts as a "clearing house" for the plant's numerous mechanical facilities and utilities. They are piped up wherever needed — through the floor of the manufacturing area or down through the luminous ceiling of the first floor.

as an air plenum for all return air other than that supplied to the Snow White area.

Conditioned air for the office or First Floor is distributed from the air handling units thru the access holes in the Space Frame bottom slab. Flexible ducts carry the air from the access holes to opague air diffusers mounted in the lumenated ceiling.

Electrical — Power is purchased at 13,200 volts from the Dallas Power and Light system. Power service from DP&L's termination poles goes underground to a primary switchgear located in the utility compound area. This area is located adjacent to the east parking lot and is accessible only to plant maintenance personnel and the utility company's personnel. The switchgear includes the two 13.2 kv feeders which have two enclosed air immersed disconnect switches. In the event of a power outage of one of the feeders, its switch can be opened and the tie-over switch can be closed so that the entire power load of the building can be thrown on the other feeder line with little interruption of service.

Power Service — Service from the primary switchgear to the building is underground through Transite conduits. Each primary feeder consists of three-conductor leaded cable insulated for 15 kv grounded neutral service, shielded.

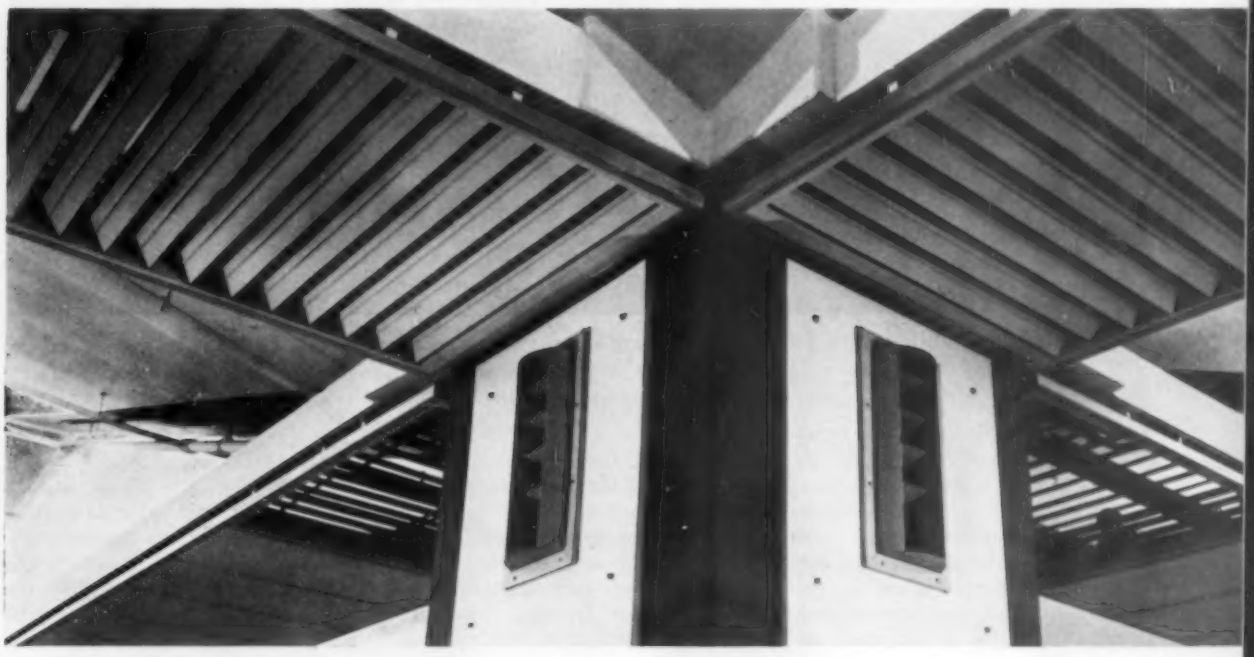
Power is distributed throughout the building at 13.2 kv, using 350 MCM three-conductor interlocked armored cable. This distribution system feeds eight 1000 kva unit substations. There are four unit substations on each primary feeder. Each substation is spotted at a power load center, with a nearly equal share of load.

Each indoor load center unit substation consists of an incoming line section, transformer section, auxiliary compartment and a distribution feeder section. The complete unit substation is of coordinated design. All sections are of equal depth and height, so that when they are bolted together, there appears to be one unit.

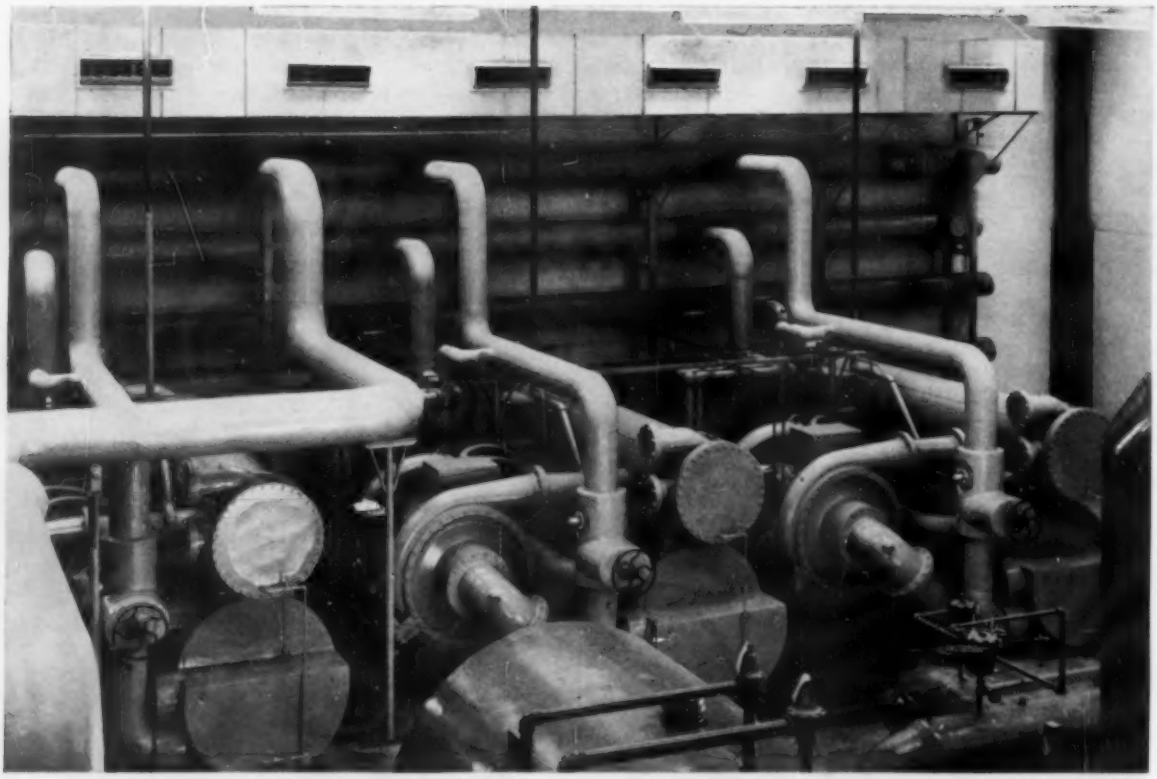
The incoming line section of each substation houses an air immersed load disconnect switch and fuse combination, together with line type lightning arrestors.

Load center transformers are of the dry type, air-cooled design for indoor service. They are designed for three-phase 60 cy service with the high side winding connected for 13,200 v delta and the low side windings for 277/480 v wye connections, 4-wire service with full capacity neutral.

Between the transformer section and the distribution feeder



Four slender columns (where roof sections meet) enclose roof drainage pipes, air conditioning ducts and sprinkler system plumbing. Conditioned air from the high velocity distribution system is directed from the columns through grilles against the hyperbolic paraboloid shell. This results in equal air dispersion over each individual bay area. Air return is through grated openings in the floor to the Space Frame area.



All outside utilities enter the plant through this two-story mechanical equipment room which contains boilers, refrigeration equipment, etc. Gas, water, electricity, communications, conditioned air, rare gases and other utilities are sent throughout the plant via the space frame.

section of each power center substation, there is an auxiliary compartment which houses not only the bus transition but also indicating meters, their related instrument transformers and transfer switches. A hinged front panel on this compartment carries an indicating voltmeter for measuring line to neutral voltage on the transformer secondary. Also mounted on this panel is an ammeter and transfer switch for the indication of current on each phase of the transformer secondary. Recording ammeters, located on the panel, are connected to the test block and plug.

Circuit Breakers — Air circuit breakers in the distribution feeder section are of the 600-v class, manually operated, three pole, trip free, equipped with dual magnetic trips and with faulted phase targets. These circuit breakers are mounted on drawout pantographs for the easy removal of the breakers for maintenance and inspection.

Interlocked armored cable and bus duct are used for the 480-v, secondary power distribution throughout the building. Bus duct in this system is of the plug-in type with rated capacity of 400 or 600 amp. Plug-in switches used are the fusible, quick-make and break type, with means of padlocking in the off position.

The grounding system for machine tools and testing equipment consists of several ⅛ x 2-in. copper bus bars with 98% conductivity. These bus bars extend to a depth of 25 ft below finish grade level; the upper terminating ends are located alongside the columns in the Space Frame area. From these termination points, the grounds are gridded through the pipe space. Take-offs from this grid are carried through access holes in the top slab of the Space Frame and tied into equipment at the required points of usage.

Lighting — A diffused and/or indirect lighting system is provided in the various areas of this new building.

Lighting for administrative offices and for the engineering labs and offices in the First Floor areas is of the luminous ceiling type. Strip light fixtures used in the installation take 96 in. fluorescent tubes and are installed against the ceiling slab at 31½" O.C. Ballasts used are 277 volt, 60 cycle, operating lamps at 430 ma. In between the strip light fixtures are acoustic panels for sound absorption and treated to give maximum light reflectivity. An aluminum member suspension system holds corrugated vinyl plastic diffusing material under the light fixture. Height from floor to plastic is 8'3½" and overall height from floor slab to ceiling slab is 10'0". Light intensity throughout the First Floor area is maintained at 100 footcandles.

Indirect lighting for the Second

Floor manufacturing areas is provided thru the use of color corrected Mercury Vapor lamps mounted in upright standards. The hyperbolic paraboloid ceiling shell reflects the light downward giving a result of equally distributed indirect light over the entire floor area. Ballasts used are 480 volts, 60 cycles. A total of sixteen 1000 watt lamps per 4,000 sq ft bay give minimum light intensity at work bench level of 65 foot-candles maintained.

All major interior lighting and the exterior lighting are controlled through the use of an IBM remote control system. All lights, except the safety night lights and the incandescent passageway lights are programmed to switch off and on at predetermined times. Overriding 24 bolt manual switches are located in various convenient locations for lighting localized areas during overtime or night shift work.

Plumbing and Process Piping — Water is supplied to the site by the City of Dallas thru two city mains. Metering equipment for water usage is located in underground vaults located at the main water supply entrance to the site. Main water lines entering the building are centrally located at the Mechanical Equipment room. Water used in the process of manufacturing the semiconductor products is deionized thru a series of Monobed deionizers — water leaving the system being controlled at 13-17 megohm resistivity.

Process gases — hydrogen, helium, nitrogen and argon — are stored in an utility compound area located in the parking area at the east side of the building. Gas lines from this compound run underground to metering equipment in the Mechanical Equipment room.

All main process piping lines loop the entire building thru the Space Frame area. Valves are installed on all main lines at 63 ft on center throughout this Space Frame. This valving method permits the installation of new equipment or the rearrangement of old equipment in unit bay sections of the office and manufacturing areas without the shut down of the entire plant.

Texas Instruments' Semiconductor-Components Building was designed by **O'Neil Ford** and **Richard Colley**, Architects (Corpus Christi and San Antonio, Texas) and their associates **S. P. Zisman** of San Antonio and **A. B. Swank** of Dallas. General contractor was **Robert E. McKee General Contractor, Inc.**, of Dallas. Air conditioning system and process piping were installed by **Beard Plumbing Company** of Dallas.

Other major contractors were: Electrical, **Harman Electrical Company**, Dallas, Texas; Sprinkler System for Fire Protection, **Grinnell Company**, Dallas, Texas. Texas Instruments supervision over design and construction was under the direction of **James R. McDade**, Industrial Engineer, and **Fred J. Snyder**, Supervisor Plant Layout and Facilities Planning.

In addition to the valves located at 63 ft on center all main process piping lines are also teed off at 10'6" on centers. This permits easy installation of any facility thru the bottom slab or top slab access holes to the point of required usage without interfering with office or manufacturing personnel. All preliminary make-ready work is performed in the Space Frame with minor final hookup done, at point of usage, during off hours either at night or over weekends.

Fire Protection — The entire building is looped with a fire line whose water supply is completely separated from the domestic water usage. All fire hydrants were located in accordance with recommendations of the Dallas Fire Department and the insurance carriers. The interior of the building, all floors including the pipe space area, is protected thru the use of a wet type sprinkler system. Supervisory controls of the sprinkler system are tied directly to the central ADT office in the City of Dallas.

The relocation of all office and manufacturing operations from their former location in downtown Dallas to this new building was accomplished without the loss of a single day's production. The company's plant engineering personnel who planned, scheduled and moved the equipment to the new location took full advantage of the convenient features built into the Space Frame to ease their task.

Almost a year of operation has proven that the building conforms to the original basic requirements as set forth by Texas Instruments management in the original planning stage: (1) Flexible, (2) Easily expandable, (3) Low in initial investment cost, (4) Economical in maintenance operation, (5) Pleasant to work and live in and (6) Contribute to the culture and beautification of surrounding communities.

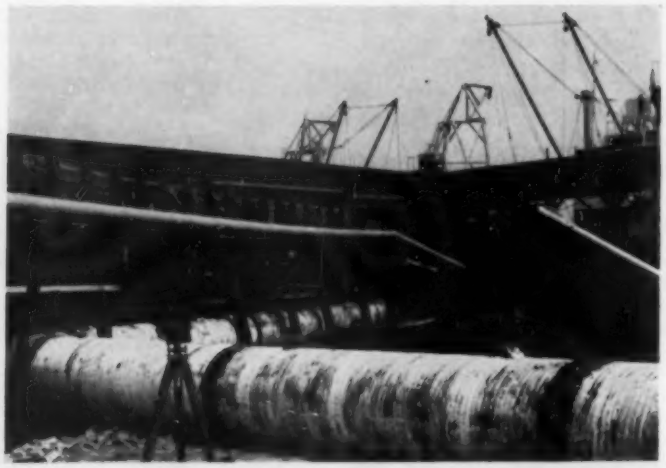
PLANT SERVICES EQUIPMENT

Texas Instruments Incorporated — Dallas, Texas

Trane Co.	**Refrigeration Equipment**
Trane Co.	**Air Handling Units**
American Air Filter Co.	**Primary Filters (Electrostatic) & Precipitators**
Niagara Blower Co.	**Air Dehumidification System (Hygrol)**
Pacific Steel Boiler Co.	**Boilers**
Marley	**Cooling Tower**
Johnson Service	**Temperature Controls (Pneumatic)**
Allis-Chalmers	**Motor Controls & Starters**
Buffalo	**Pumps (HW & CHW)**
Allis-Chalmers	**Transformers**
Permutit	**Water Deionizers**
Ruby and Westinghouse	**Lighting Fixtures — Fluorescent**
Westinghouse	**Lighting Fixtures — Mercury Vapor**
Joy	**Air Compressors**
Grinnell Company	**Sprinkler System**

Savannah, Georgia . . .

New Flume



THE Savannah Sugar Refining Corporation, Savannah, Georgia, requires considerable quantities of cooling water for the condensers at their Port Wentworth installation. For many years this water was conveyed by a wooden flume, about 500 ft long, from the Savannah River to the cooling water reservoir. Because of frequent maintenance and loss of water, the flume has now been replaced by Armco asbestos-bonded Smooth-Flo pipe.

wood replaced by asbestos-lined pipe

In the original installation, three pumps with a total capacity of 14,320 gpm lifted the water from the river and discharged it into the flume. Now, these same three pumps empty the water into a steel junction box that vents the water into the atmosphere through a standpipe of 36-in. diameter asbestos-bonded pipe, 10 ft high. From this junction box, the water is pumped uphill against a 9 ft head through the Smooth-Flo pipe. Water empties into the reservoir.

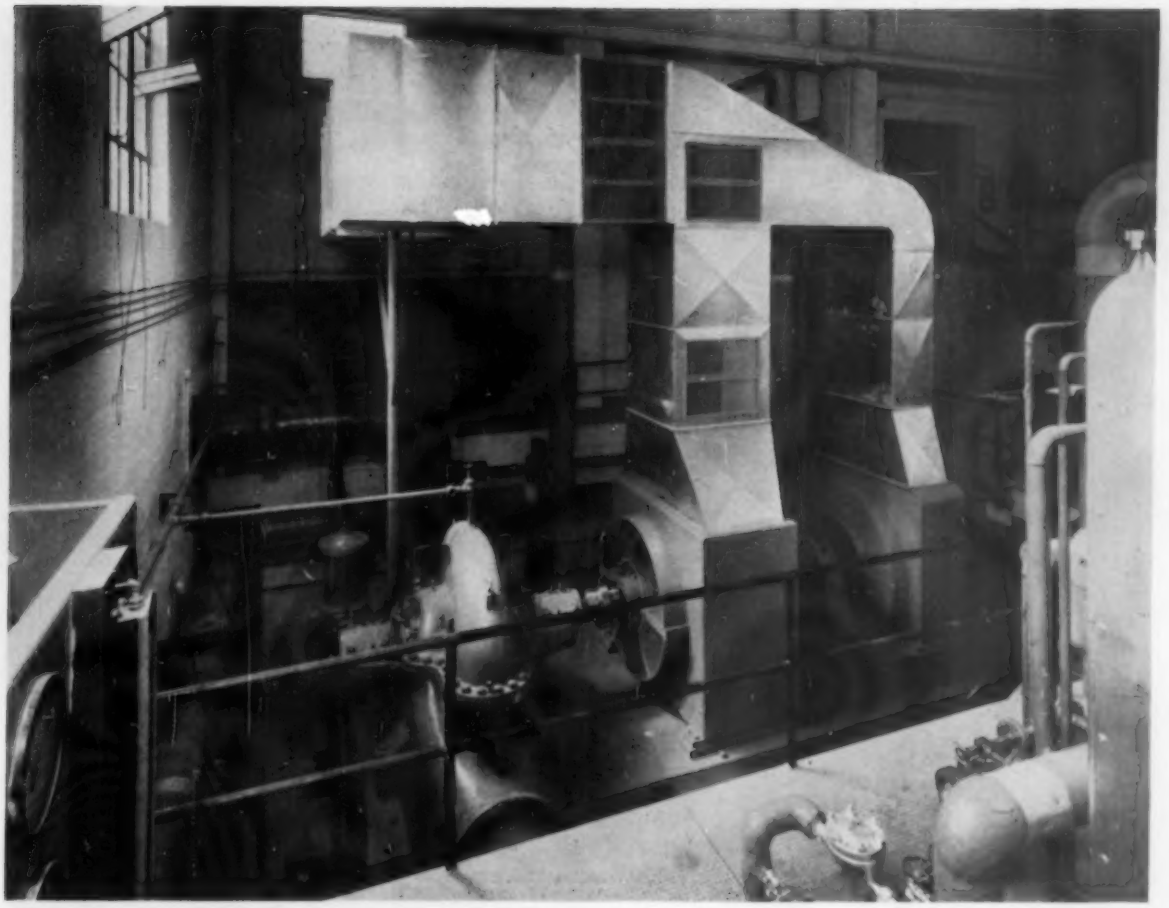
The pipe is 42-in. in diameter, 12 gage and 572 ft long. Watertight bands joined the individual pipe lengths.

The wooden flume was kept in operation during the new installation.

Design and construction of the installation was handled by the engineering department of the Savannah Sugar Refining Corporation.

Wooden flume at right was formerly used to carry water for cooling condensers. Replacement pipe at left is Armco asbestos-bonded Smooth-Flo pipe.

Note in photo at top of page that old wooden flume is higher because it depended on gravity flow. New pipe operates under a head.



Flexibility in City Pumping

THE LATEST expansion of Tulsa's pumping station was completed in 1957 with the addition of a 20 mgd motor driven unit using a magnetic coupling for varying the pump speed and capacity. This unit was furnished by the De Laval Steam Turbine Company with an Electric Machinery Mfg. Company electric motor and magnetic coupling. The motor is a duplicate of two 1500 hp motors installed in 1955.

The magnetic drive is desirable from the station operating standpoint since with this variable speed drive the unit can be used for capacities ranging from 6 mgd to 20 mgd. The magnetic drive also permits bringing the unit on and off the line as required with a minimum of hydraulic disturbance.

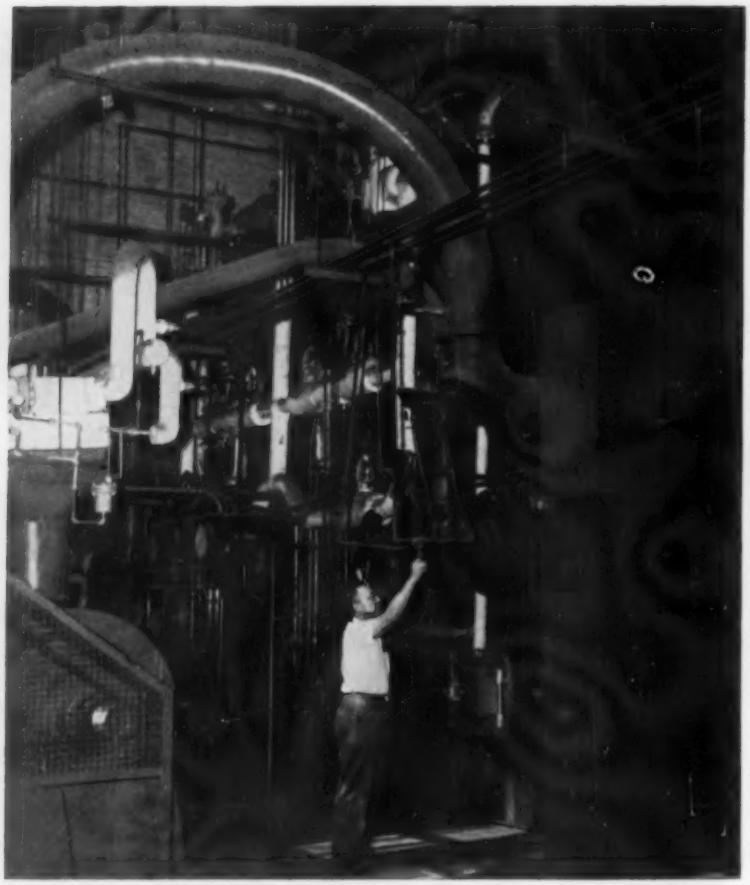
Ventilation for the motor and magnetic coupling is provided by a natural draft system exhausting to a stack and is designed to limit pressure drop in the equipment to the level specified by the electrical manufacturer. The vents and dampers in the ductwork allow the operators to use the warm air exhaust to heat the pump room in the winter.

With the addition of this pump in 1957 it is felt that the pumping station has reached the economic limit of capacity. There is now installed a total capacity of 167 mgd; 92 million of this is turbine driven capacity and 75 million is electric motor driven capacity. This means that with the largest unit out of service the dependable peak capacity of this station is 137 mgd, which should take care of the requirements of the City through the summer of 1960.

The combination of steam and electric drive gives this station a flexibility of operation which is very desirable and since all but 55 mgd of this capacity is variable speed drive this station can operate very efficiency through almost any range of demand capacity.

W. R. Holway and Associates, Consulting Engineers of Tulsa have served as engineers on this and other expansions since 1904.

By WARNER M. BYARS, Chief Engineer, Mohawk Pumping Station, City of Tulsa Water Department.



Old boilers at left were too big for efficient operation after load and pressure were reduced. New units operate around 75% efficiency and generate about 10,500 lb/hr.

Clinton, South Carolina . . .

Process Steam Case Study —

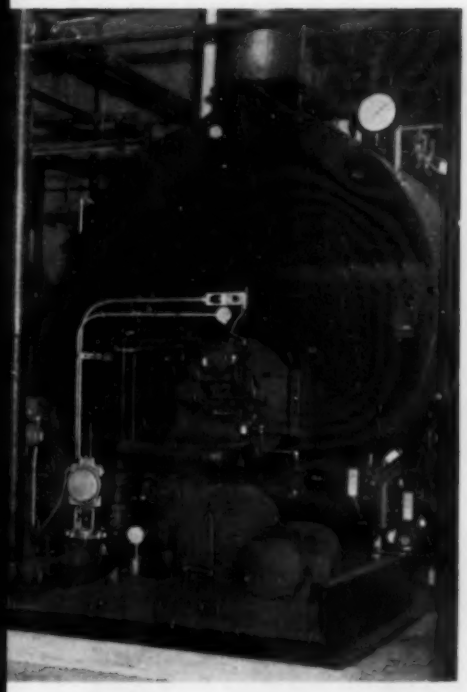
A PACKAGED boiler installation at Clinton Cotton Mills, Clinton, South Carolina has offered substantial operating and maintenance savings. A rising power demand made it impractical for the mill to generate its own power. Capacity was insufficient and managment decided to contract for electric power.

This left three coal fired boilers suitable for operation at 400 psi and 725 F. Two boilers each had capacity of 32,000 lb/hr, and one a capacity for 75,000 lb/hr. These boilers were too big to efficiently supply the greatly reduced steam demand which was for processing and heating only, despite the reduction to 125 lb operating pressure.

Management decided to replace the old boilers, and two Cleaver-Brooks package type boilers were installed, each rated at 300 hp. The new boilers are gas and oil fired and run on gas with interruption agreement, depending on local demand. The new boilers have been in operation for over a year with minimum maintenance and no difficulties.

Less overhead is required to operate the new boilers which perform at 75% efficiency. Operating costs at 70% efficiency are sufficient to realize a substantial annual saving.

Gas is used for fuel 73% of the



At the right, E. P. Taylor, master mechanic, checks automatic control panel. Gas-oil fired boilers require only periodic checks on pressure and water level.

. . . By E. P. TAYLOR,
Master Mechanic, Clinton Cotton Mills

— OLD BOILERS WERE TOO BIG

time, and oil is used for fuel 27% of the time.

Package Type Units

Each new boiler generates about 10,500 lb/hr at 212 F, up to 150 psi maximum. The new boilers are automatic and only require periodic checks on an hourly basis to see that pressure and water level are satisfactorily within safe range.

About 30 minutes each shift is sufficient time for blowdown.

Only treated water is used in these boilers, and the water is treated by Nalco chemicals. Chemicals are fed into feedwater pump, and mill personnel checks the water daily to be sure of correct treatment. Nalco makes monthly checks. The filter plant operator makes water checks for the mill.

Better pressure control of the new boiler provides better drying at the slashers and more uniform heat on slasher cans with less pressure variation.

Total heating load now required less 10% losses is 17,685,000 Btu/hr. (5,000 lb/hr summer and 10,000 lb/hr winter.)

After removal of old boilers and old concrete footings and floor, a new floor and footings for the new boilers were poured. Installation of the new boilers was accomplished with a minimum of trouble.

Columbia, South Carolina . . .

LUBRICATING
Heavy Duty Bearings

PHOTO is a head-on view of a 24-in. steel pipe in a steel casing being spun 450 revolutions a minute so that centrifugal force will distribute concrete evenly over the inside of the pipe.

High speed revolutions of a two-ton weight can make lubrication of roller bearings a major headache — but the addition of a continuous water spray to the installation makes the problem even more acute.

The Lock Joint Pipe Company found this tough lubrication problem confronting it at the firm's Columbia, S. C., plant, where large-diameter steel pipe is manufactured.

The pipe, 24- to 48-in. in diameter, is made of 16 gauge steel sheets, lined with a layer of concrete, wrapped with a prestressed wire and coated with a ¾-in. of concrete on the outside.

Sixteen foot long sections of the pipe are spun horizontally at high speeds, while concrete is pumped into the interior permitting the centrifugal force to spread the concrete lining evenly and uniformly.

Before being subjected to the spinning action, the steel pipe is put into a heavy steel jacket with flanged ends. The combination then is mounted on four rotating wheels which spin the pipe at 450 to 600 rpm.

The entire assembly rests on these spinning wheels — the shafts of which are supported on pillow blocks containing roller bearings. The bearings are subject to the "friction-heat" generated by high speed and heavy load. Further complicating this lubricating problem is the presence of water. As the concrete is centrifugally placed in the pipe, water is squeezed from it. This water drains in a washing action over the pillow block roller bearings.

"The lubrication problem for those eight pillow blocks always was a tough one," according to Jim Norton, Lock Joint plant superintendent. "In the beginning, we used loads of grease to protect against hot blocks and to exclude water."

In place of a lubricant which required application every week,

they now use Gulf XXX Lubricant, which is applied only once each month to the small blocks and twice monthly to the large ones.

In addition to protecting the bearings, Gulf XXX Lubricant locks out all dripping water on the installation, Mr. Norton reports. The lubrication savings amounts to 50% in material, plus maintenance time savings, he adds.

Lock Joint Pipe Company also changed to a Gulf product for the electric motors which spin the heavy pipes. Eleven quarts of Gulf Harmony 97 were placed in the big Reeves gear-head, varidrive motors and only an annual change is needed despite the continuous heavy duty strain placed on them.

High stacking of unit loads on pallets permits fast, efficient handling of frozen goods. Orderly stacking contributes to the ease with which loads can be located when they are to be shipped.

High Stacking at Sub-Zero

SUB-ZERO conditions do not complicate industrial truck operations for the Mid-South Refrigerated Warehouse Company at Memphis, where four Elwell-Parker electric-powered trucks serve a million cubic feet of refrigerated storage space.

The company, one of the nation's largest and most modern cold storage warehouses, has a total quick freezing capacity of 400,000 per 24 hours.

Based on the volume of materials handled, it is quite remarkable that so few fork trucks can adequately perform this huge handling job on a continuous day-to-day basis. To accomplish this, however, the following handling techniques are employed:

All material is handled on pallets. Much of the incoming merchandise is received palletized, and that which is not, is immediately transferred to pallets upon arrival.

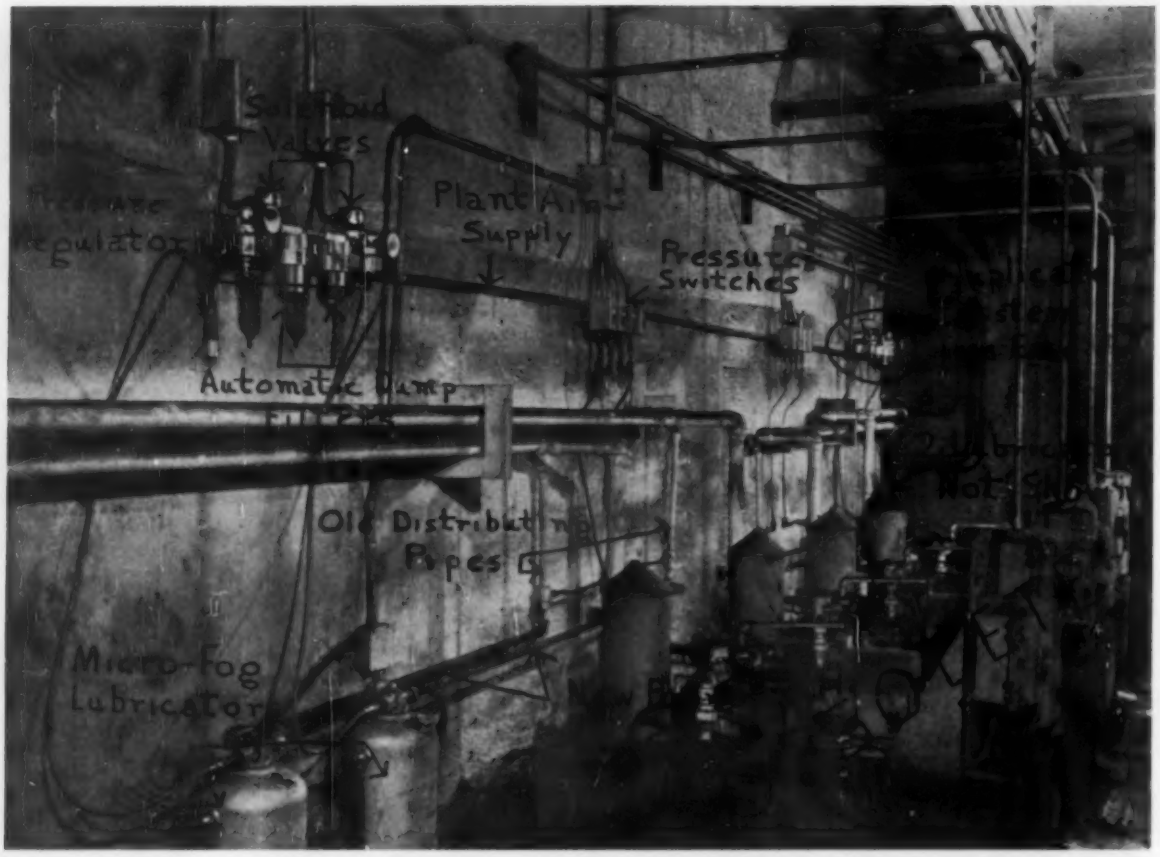
This unit load system of handling reduces manual effort and simplifies location of goods in storage, and since the operation is seasonal, permits handling of a huge volume in a short period of time.

The second factor contributing to handling efficiency is the storage of goods to maximum ceiling limits of more than 16 feet. This is especially important because of the premium placed on refrigerated storage space.

Mid-South maintains temperatures at from zero to —20 F. Even so, there has been no difficulty in operating or maintaining the batteries of the electric trucks.

The trucks are moving in and out of the cold constantly and there is thus not enough time for the large mass of the battery to be cooled noticeably. Furthermore, the truck is normally working when in the cold room and thus generating some small amount of heat.

Actually there is slight danger of the electrolyte freezing. A fully discharged battery can withstand temperatures of —90 F without freezing; and even when completely discharged, can normally withstand temperatures lower than the average freezer room.



Charlotte, North Carolina . . .

"FOG" LUBRICATION Cuts Oil Consumption

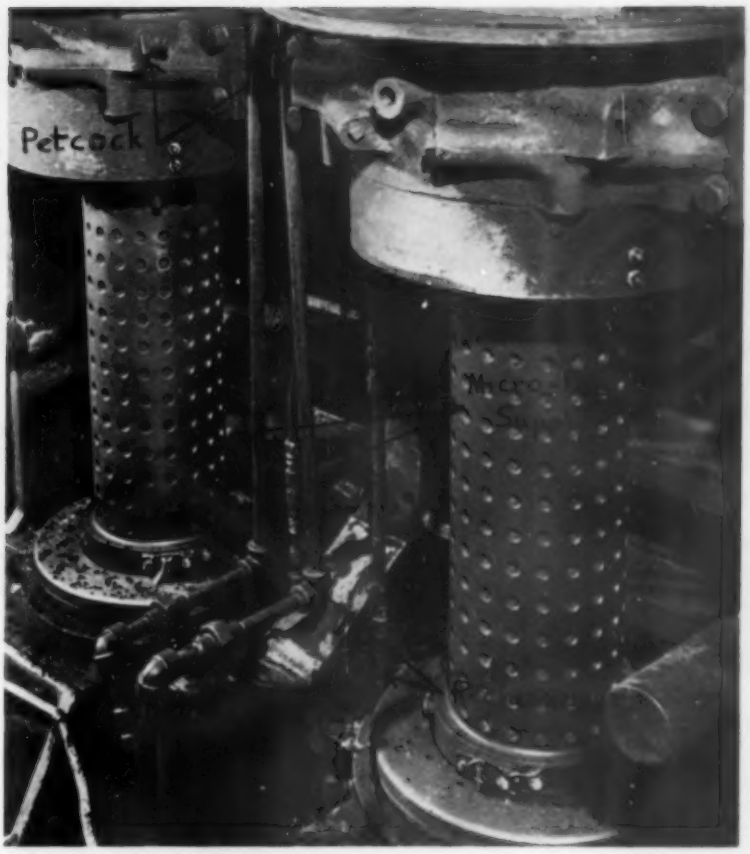
LUBRICATING oil consumption was cut from 54 gallons per day to approximately 54 gallons per week at the Charlotte Pipe & Foundry Co. by the installation of an efficient and effective oil distribution system on centrifugal cast soil pipe machines.

The change, made in August 1957, is based on the use of the plant compressed air supply. The air is passed through a filter with a 25 micron screen which removes water and fine particles of dirt, scale, and other foreign material. A pressure regulator reduces the plant air pressure to 60 psi, and a solenoid valve turns the lubricating system on or off when the machines start or stop.

How System Operates

Air passes through a lubricator which breaks up the oil into a fine fog for transmission through the original pipe distribution system (see illustration) to the bearings. At each bearing, a special nozzle or reclassifier brings the fog together to produce large oil particles and to speed up the flow of the airborne fog so that the oil will wet out on impingement. The system delivers a constant supply of fresh oil to keep a film on all bearing parts.

There are sixteen 10¼" and eight 8¼" Timken bearings on the four 4-flask machines and the two 2-



New lubricating equipment in basement (photo on opposite page) has eliminated for ¾ hp motors, tanks and some pumps.

Photo at right is closeup of piping, reclassifier and petcocks on two-flask pipe making machine.

The C. A. Norgren lubrication system, affording big cut in oil consumption, was installed by L. W. Kinnear & Co. of Charlotte.

. . . Charlotte Pipe & Foundry Co.

flask machines being lubricated.

The lubricating equipment is installed in the basement approximately 20 ft below the machines with a horizontal distance of about 25 ft to the extreme machine. Each machine has its separate lubrocontrol unit.

A flexible hose used in the original circulating system connects the distribution pipes to the flasks so they are free to swing from a horizontal to a vertical position during the casting operation. The return lines of the original system were disconnected at the cradle supporting the flasks, and the opening was closed by a plug with a ¼" hole in it to vent any excess fog or air pressure.

The new lubrication system uses 60 psi pressure with an attending air consumption of approximately 40 cfm for all four machines. Estimating at 7 cents per 1000 cu ft, the cost is about 17 cents per hour.

During the first month of operation with the new system, the bearing temperatures were checked constantly with thermocouples. Temperatures averaged from 110 to 120 F, compared to a previous 120-140 F average.

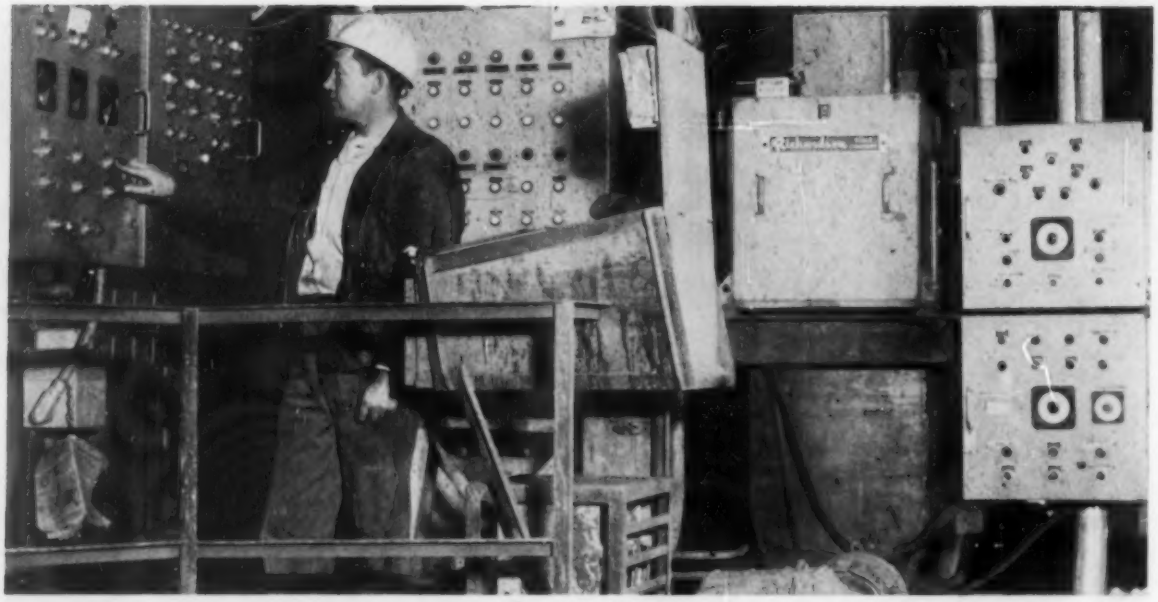
Safety Features

As a safeguard against possible blocking of the reclassifier openings, a petcock was installed in one of the passages leading to the bearings down stream from the reclassifier. These petcocks can be opened at any time, and escaping air is evidence that the reclassifier is not plugged. Other safeguards include a float in each oil reservoir which will shut off the machine when the oil level drops too low. Also, a pressure switch in the distribution system stops the machine if the air pressure fails.

While the operating pressure is 60 psi on the lubricators, the pressure in the distribution system is about 10" of water column. This reduced pressure eliminates the escape of oil through the bearing seals but is sufficient to keep dirt and dust out of the bearings. With the former circulating system, oil escaped through the seals causing occasional flash fires as well as the need for extra sand treatment.

Replacement of several flask parts gave the plant engineer a chance to check the bearings. They were found in excellent condition.

The new lubricating system has eliminated the use of four ¾ hp motors on the oil circulating system as well as other pumps used to filter the return oil. Recent checks indicate that oil consumption may be as low as one barrel of oil every three weeks while attaining good lubrication.



Rockwood, Tennessee . . .

Improved AUTOMATIC WEIGHING

IN THE large-scale production of low carbon ferrochrome used in the manufacture of stainless and other corrosion-resistant steel, the weighing and batching of a series of ingredients is an almost continuous process.

Depending on the grade of ferrochrome to be made, varying but exact amounts of chrome ore, high calcium pebbled lime and a metallic reducing agent to smelt the ore must be combined during the milling and smelting operations. Certain physical properties of these ingredients, such as abrasiveness, fineness and tendency to flush, add further production problems.

At the Roane Electric Furnace plant (Rockwood, Tenn.) of Tennessee Products & Chemical Corp., mix for ferrochrome furnaces is made in rates exceeding 25 tons an hour. The following grades of ferrochrome are produced: Chromium — 67/72%; Carbon — .025%, .05%, .10%, .20%, .50%, 1.00%, 1.50%, and 2.00% maximum.

With the recent increase of industry demand for this product, more efficient and rapid production procedures had to be devised. A primary consideration was given to the design of a fool-proof weighing and handling system. For this purpose, Tennessee Products & Chemical Corp. consulted with engineers of Richardson Scale Co.

Two Major Handling Systems Needed

Basically, the production of ferrochrome is centered around two major operations: milling and smelting. In the milling operation, the chrome ore is reduced in particle size; and in the smelting operation, a reducing agent is added and the various grades of finished product developed.

At Roane Electric, there are two grinding mills: one for Mix "B" and the other for Mix "A." From ten large storage bins, varying amounts of ingredients must be selected, withdrawn, weighed, and fed through a system of screw conveyors, natural frequency carriers and elevators to one of these two mills.

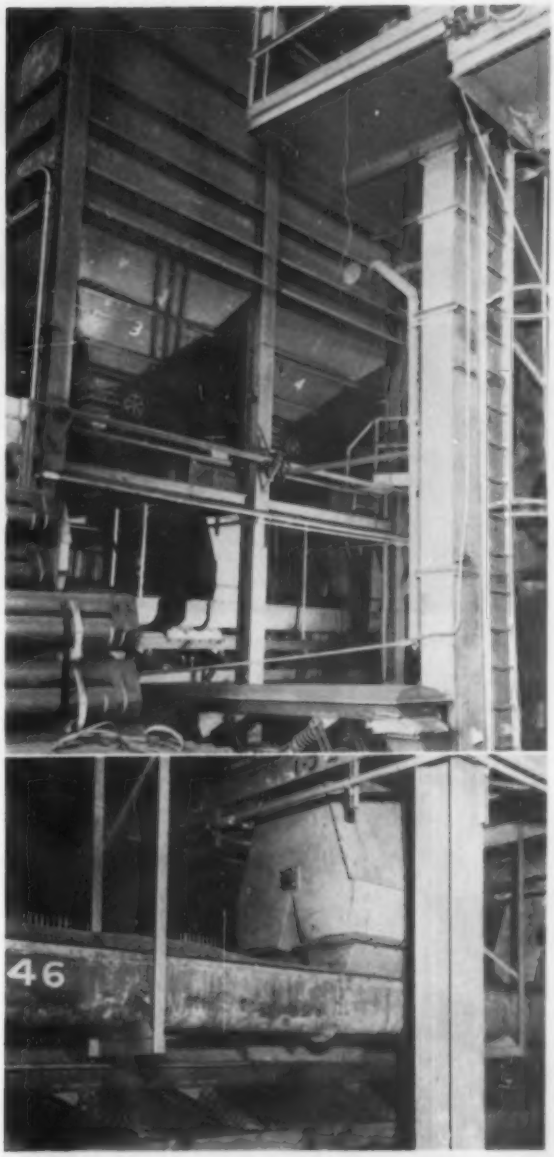
From the mills, inclined screw conveyors take the mixtures to receiving surge hoppers and another series of proportioning and weighing operations are conducted. Here, vibrating feeders then deliver into compartment-type, 20,000-lb batching hoppers which are lifted by an overhead crane into position above the furnace. Material is then fed into the furnace for smelting.

In addition to the precise control which it is necessary to exercise over weighing and proportioning, a system of interlocks was vital to assure that certain of the basic ingredients could not be mixed together by accident. These, in short, were the main prob-

CONTROL PANELS (opposite page) direct complete weighing and mixing operations from this centrally-located station. Automatic Richardson weighing system has an accuracy requirement of less than 1%.

TOP PHOTO shows two of a series of hoppers which deliver to Richardson E-50 scales. Scales, in turn, discharge to screw conveyor and natural frequency carriers (center). Material then is lifted by enclosed elevator (right center) and ultimately fed into grinding mill. Entire system mixes as it conveys.

CLOSE-UP (lower photo) of bifurcated bottoms of scales discharging directly into screw conveyor prior to smelting.



- ***Weighing for grinding***
- ***Weighing for smelting***
- ***Over-all process control***

lems to be dealt with: weighing for grinding, weighing for smelting, and over-all process control.

Weighing & Proportioning for Grinding

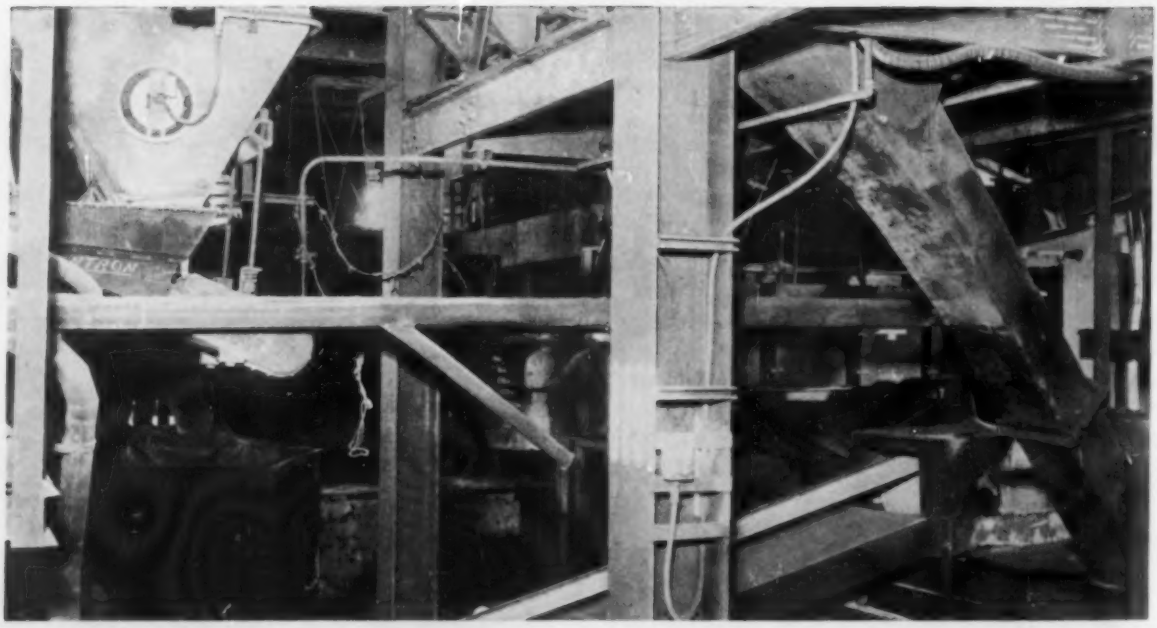
To meet the precise control requirements for weighing from the ten storage bins, Richardson's E-50 automatic bulk weighing scales are used. One of these services the three bins holding the acid ingredient, and the remaining seven bins each has its own scale located directly beneath.

Material is delivered from the bins to these totally enclosed scales by a vibrating feeder. The vibrating feeder controllers are mounted right at the scale locations so that individual adjustments may readily be made.

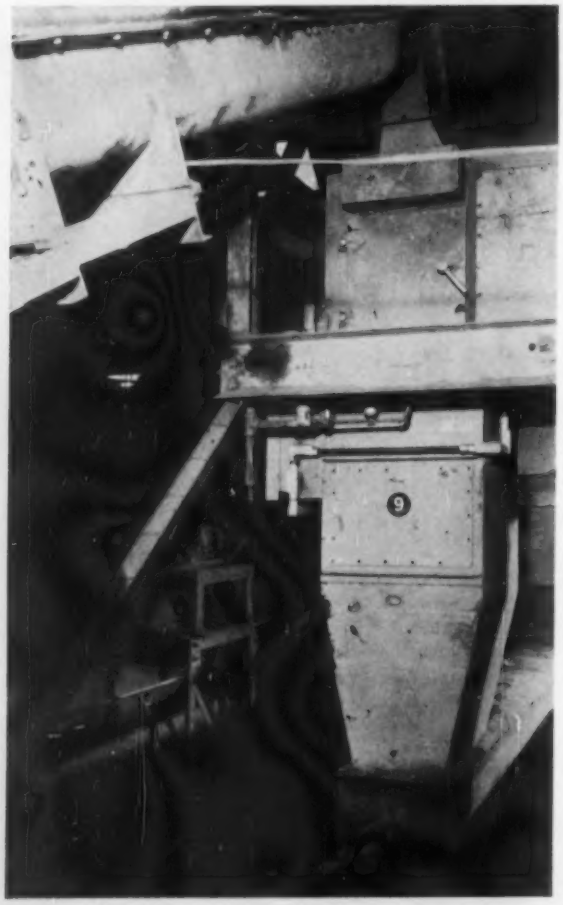
At each scale inlet is a pneumatically-operated and brush-sealed radial gate which opens to permit the material to flow to the weigh hopper. This hopper is suspended from one end of a very low ratio one-piece scale beam. At the other end are counter-weights and the indicator to show the balance on test weighings.

Upon completion of the weighing, the beam actuates a limit switch which causes the inlet gate to close instantly, interrupting the flow of material from the supply in the bins above. Each scale is also equipped with a subsidiary beam for weighing fractional amounts (¼ - 1 lb) within the range specified.

The seven scales handling material going either to Mix "A" or Mix "B" have a bifurcated bottom hopper, each side of which delivers to one of the collecting line screw conveyors which feeds each of the two mills. Each of these scales has a three-position selector switch reading Mix "A" — "Out" — Mix "B." Diverter action is manual, and the system



IMMEDIATELY prior to smelting, hopper (upper left) discharges by Syntron feeder into scale (left), from which weighed mixture is carried by belt conveyor (foreground) to final discharge point.



INCLINED screw conveyor (upper left) brings material to hopper of scale which weighs into another screw conveyor (lower center). Here it is blended with a second ingredient (rear). This is between milling and smelting operations.

is so interlocked that when any scale is selected for for Mix "A" its diverter must have been properly positioned before the system functions. The acid ingredient discharges only to the one screw conveyor.

A common control panel of dust-tight construction houses the necessary relaying equipment for these eight scales. It contains a main "controls on" selector switch to provide the electrical power for the entire system.

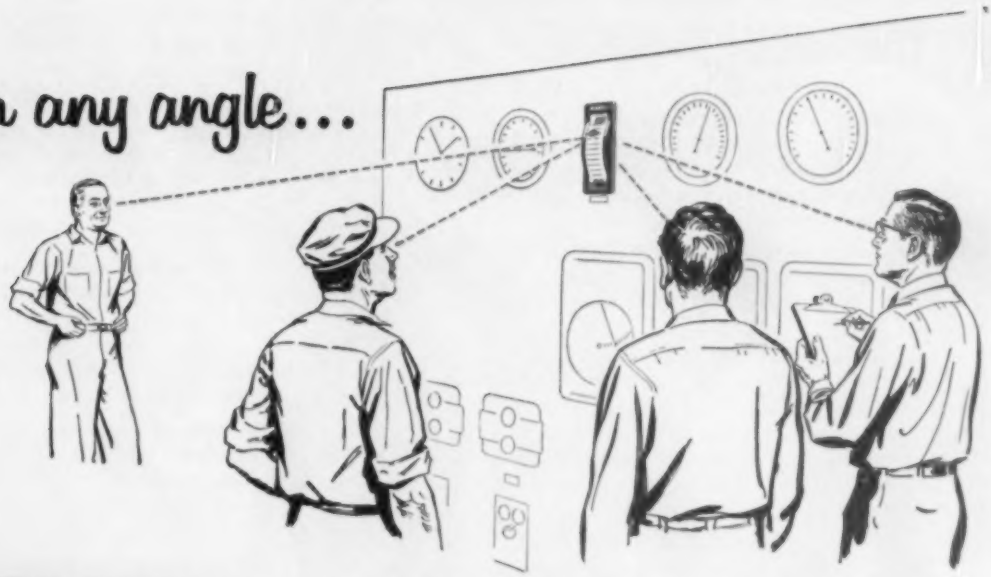
Two separate tonnage controllers are used, one for each line, since the Mix "A" line and the Mix "B" line operate at different rates. Scales selected on any given mixture for Mix "B" discharge at the rate determined by the Mix "B" tonnage controller, and the same is true for the Mix "A" line. All scales selected to either line make a weighing and discharge simultaneously.

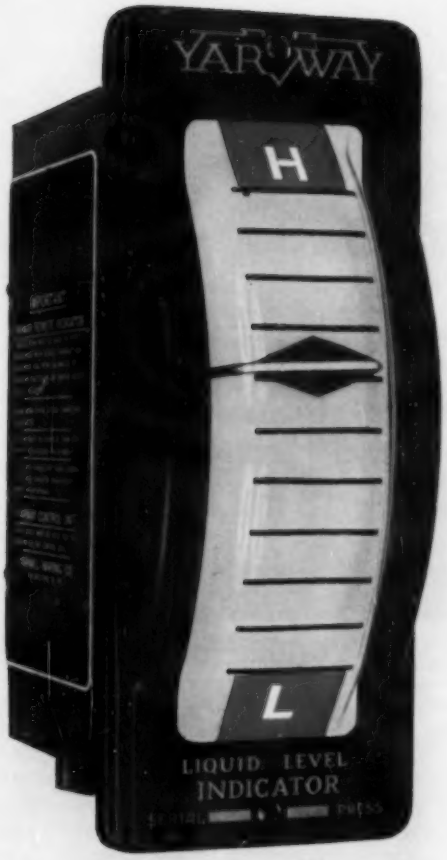
Interlocks assure that all scales are automatically checked to insure they are ready to discharge, and also to determine that they have discharged before it is possible to start a new feed cycle. Discharge of the scales is interlocked with the operation of the respective collecting line screws.

Weighing & Proportioning for Smelting

Automatic scales (Richardson E-50) are also used

from any angle...





BOILER WATER LEVELS ARE EASIER TO READ with YARWAY INDICATORS

No matter where you stand, you can see at a glance your boiler water level in the Yarway Remote Liquid Level Indicator. The clear, "wide vision" face permits easy readings from any point in a 180° arc.

Readings are instant and accurate because the operating mechanism is actuated by the boiler water itself—by the pressure differential between a constant head and the varying head of water in the boiler drum. Pointer mechanism is never under pressure.

Yarway Remote Indicators are available fully compensated for every change in boiler temperature and pressure and they can be connected to Electronic Secondary Indicators or remote Hi-Lo Alarm Signals (lights or horns), located at any other point in the plant. Also available, Yarway Recorders working on same simple principle.

Over 12,000 Yarway Remote Indicators already installed.

Write for full details on Yarway Indicators for boilers, heaters and other applications. Bulletin WG-1824 tells all, shows typical hook-ups.

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YARWAY

...a good way to specify remote liquid level indicators

(Automatic Weighing)

in weighing to the furnaces. There are three of these for weighing predetermined amounts of Mix "A," Mix "B" and high calcium pebbled lime. Each has subsidiary beams and receives material from several bins through individual vibrating feeders.

The Mix "A" scale had to cope with the special problems presented by the fact that extreme caution in handling Mix "A" was vital to prevent dangerous flushing. Therefore, a flush-governing vane feeder was recommended for feeding the material into the low capacity top hopper. A ten cubic foot volume between the feeder and the low level switch serves to de-aerate the fine mixture and allow it to settle. To prevent very fine material from leaking through the scale discharge door, an air-operated flushproof door and mechanism is used.

The vane feeder is controlled by the level of Mix "A" in the top hopper, and the scale will not weigh unless the level of material has at least actuated the low level switch. Similarly, the feeder will start only after the level of material has gone below the low level switch and will continue to run until the high level switch stops the feeder.

These three scales load the batch buckets which are hoisted for delivery to the furnaces. These buckets are of compartment-type and hold up to 20,000-lb batches. A keyed lock-out switch in the control panel prevents lime from being discharged into the same batch bucket with Mix "A."

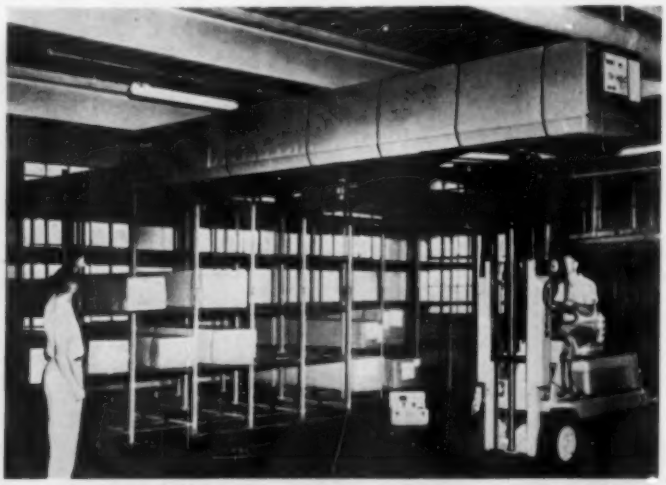
For this entire system, a wall-mounted control box contains microflex stop counter circuits to determine the amount of material to be delivered, the scales discharging at will. It also contains "Power on," "Batch running," and "Batch completed" lights with "in-out" selector switch for each scale.

Each of the three scales mounts a "test-run" selector, as well as the controller for the feeder for compensation correction.

With these systems of scales and control panels, it is possible for a single operator to direct, from a central control station (see photo 5), the complete processing from storage to furnace, and possibilities of human error have been eliminated.

At Dalton, Georgia . . .

Handling Long Unit Loads



IN THE carpet mills of Cabin Crafts, Inc., Dalton, Georgia, three "Ro Loaders" (Little Giant Products, Inc.) are handling long cartons of carpet weighing up to 1000 lb from the packing department, to racks, to trucks and boxcars with one man per unit. Eleven men were formerly required for this job.

The "Ro Loader" is a hydraulic attachment which can be easily mounted either on the forks or apron of any make and model lift truck of adequate capacity. A four-way valve is the only control required.

When the "Ro Loader" equipped lift truck reaches the desired location, the conveyor is swung 90° to the right or left with the live roll under the end of the unit to be moved. Carriage is then raised so that the load is carried on the live roll and the hydraulic motor revolves it clockwise, pulling it onto the conveyor.

Conveyor is then swung 90° to the straight-ahead position and the truck moves into a trailer or boxcar where it swings the conveyor to the proper angle to spot the load. Hydraulic motor is then operated counter-clockwise and the live roll pushes the load off.

General industrial applications are extensive. Units with 24" conveyors are handling long unit loads such as carpets in rolls or cartons, packaged bus bars, conduit, building products, etc.; long non-unitized loads such as pipe, tubing, bars and similar products stored in racks; and packages of all kinds stored in racks with rollers sloping to the front.

Units with 48" wide conveyors are handling unitized or packaged lumber with dunnage separators between packages; unpackaged lumber; and cotton bales during the operation of sewing the bagging on both ends and loading them in trains or trucks.

RECIRCULATION in Water-Cooling Towers

RECIRCULATION, a new 12-p technical bulletin by the Cooling Tower Institute, describes a 7-year field research program upon which the development of a "recirculation factor" for industrial water-cooling towers is based.

Recommended application procedures are tabulated and suggested tower orientation for minimizing recirculation and the effects of one tower upon an adjacent tower is also diagrammed.

Bulletin PFM-110 at $1 per copy is available from the CTI office, 420 Emerson St., Palo Alto, California.

Facts on LIGHTNING

THE HAZARDOUS antics of lightning and means of protecting life and property against lightning are contained in a new free booklet *Lightning Facts and Figures* available from the Lightning Protection Institute, 53 West Jackson Blvd., Chicago 4, Illinois.

Sections cover how lightning happens, properties, dimensions, targets, factories and warehouses, stacks, mills and elevators, lumber yards and mills, and comments on personal safety and protection for all types of buildings.

Fittings Manual

TECHNICAL data manual, providing information to all who specify, purchase or install stainless steel pipe fittings, is available from the Ladish Co., Cudahy, Wisconsin.

Your letterhead request will bring a complimentary copy of the 86-page Stainless Steel Catalog, which gives information on a broad line of both IPS and Tube OD Welding Fittings, Screwed and Socket Welding Fittings and ASA, MSS and Corrosion Weight Flanges.

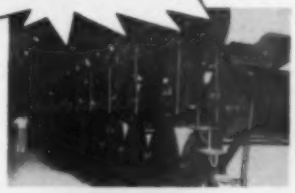
THE MAGIC OF *Norgren* MICRO-FOG LUBRICATION

OIL CONSUMPTION CUT 80%

Charlotte Pipe & Foundry Eliminates Costly Oil Circulating System

Four machines for centrifugally casting soil pipe converted to Micro-Fog Lubrication. Results: • Saved 216 gallons of oil a week. • Bearing temperatures reduced 10°-20° F. • Ended flash fires resulting from oil leakage. • Eliminated four ¾ hp pumps on oil circulating system.

BEARING TEMPERATURES REDUCED 8°-10° F



St. Regis Paper Co., Pensacola, Ends Paper Losses Due to Oil Leaks

174 bearings on paper machine dryer sections converted to Micro-Fog Lubrication. Results: • Micro-Fog Lubrication by far the most thorough. • Reduced lubrication system maintenance. • Less lubricant consumed. • Ended paper losses due to excessive lubrication. • Bearing temperatures cut 8°-10° Fahrenheit.

HAND OILING AND GREASE DRIPPAGE ENDED

Erwin Mills Converts 3 Dry Can Stacks to Micro-Fog

Results: • No significant bearing wear in 12 months operation. • Bearing temperatures reduced approx. 10° F. • Costly hand lubrication of bearings ended. • No lubricant dripping from bearings. • Big savings in lubricant and maintenance costs.

For complete information WRITE FOR DESCRIPTIVE LITERATURE.

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Here is the way Norfolk Naval Station is

Welding Thin Stainless Steel

A welding operator, using a Heliarc HW-10 torch, carefully welds new fins into place. Damage is frequently caused by overheating or by dirt.

This nozzle box has been perforated by a fin from the turbine wheel. Repair with Heliarc welding saves $700 in replacement costs on this part alone.

PROCEDURES developed by aircraft maintenance engineers will help those concerned with repairs of special metal components developed to withstand high temperatures and pressures in industry.

Metal-murdering heat inside the mighty engines of space-age aircraft is often quenched with the aid of special cooling turbines. But even these turbines can be overworked by constant super-sonic speeds which cause dangerous cracks and scars in the turbine fins and housings.

In one radically-new engine, three cooling turbines are used to minimize the searing internal temperature. Each turbine consists of a "nozzle box" or housing, a turbine wheel that generates the air flow, and a "cooling cap" that directs the air flow into engine hot-spots.

Any damage usually affects the entire unit. **Replacement cost:** $2,300 — $400 for the cooling cap, $700 for the nozzle box, and $1,200 for the turbine wheel.

It was this terrific cost that spurred the Norfolk Naval Station, Norfolk, Virginia, to search for an effective repair method. Requirements were tough: the special stainless-steel alloy fins were exceptionally delicate, measuring as low as .004-in. thick. And to perform efficiently, the repaired housings and cooling caps, as well as the turbine fins, had to withstand the vibration of 14,000 revolutions per minute and temperatures exceeding 1750 degrees Fahrenheit.

Heliarc Welding

After other methods had failed, Linde Company's Heliarc welding process was tested on a run of badly-damaged turbine units. Naval engineers knew that this versatile welding process could handle the cracked cooling caps and worn nozzle boxes . . . the turbine wheels

were the real barrier.

On each turbine wheel damaged fins are first mechanically cut from the hub. The cut section is machined to a U-shaped and ground to a satin finish. New fins are then attached to a special alloy base that has been precision-shaped to the contour of the finished cut.

This piece is then welded in place with a Heliarc HW-10 torch and nickel-alloy welding wire. An extra-long electrode is used for welding in tiny, hard-to-reach areas. Linde's 99.995% pure argon, protects the delicate welds from contamination.

The Heliarc welded units easily withstand severe endurance tests. Results of the first tests convinced even the most skeptical: average cost of repair on the first run — **$150 per unit.** Today, more than $2,150 is being saved with each damaged cooling turbine reclaimed.

Condenser Handbook

ENGINEERS looking for a simple method of calculating steam condenser performance can check C. H. Wheeler's new 38-page *Condenser Handbook* containing a number of basic formulae for calculation of condenser heat transfer coefficient, cooling water flow rate, condensing surface and other data.

A large part of the Handbook is made up of curves and charts on condenser performance, heat transfer correction data, pressure loss in water boxes, etc.

Copies of the *Condenser Handbook* are available without charge when requested on your company letterhead. Write: C. H. Wheeler Mfg. Co., 19th and Lehigh Ave., Philadelphia 32, Pa.

there is always a BETTER WAY

see page 72

Safe, sure check on boiler water levels with wide-vision EYE-HYE

The remote gage with liquid indication

EYE-HYE for pressures up to 600 psi

EYE-HYE for pressures up to 3000 psi

Put your boiler water level supervision on a plane with other power plant control facilities — read levels at your control station with Reliance EYE-HYE.

The dependable accuracy of this popular remote reading indicator eliminates "boiler-climbing"; its bright green liquid-column image stands out — mistake-proof. And EYE-HYE's improved design provides visibility over a wide arc — lower pressure models up to 90°; new higher pressure models, to 180°.

Simple manometric design, with no mechanical parts and no adjustments on location. Available with economical special attachment to actuate supplementary alarms . . . Write for catalog information on EYE-HYE for *your* boiler pressure.

The UNITEMP, complete temperature equalizing unit furnished with each EYE-HYE

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Decatur, Alabama Plant Uses Different Approach . . .

Protection and Public Relations

By PAUL ROBSON
Plant Manager
Wolverine Tube Division
Calumet & Hecla, Inc.
Decatur, Alabama

MANY companies consider plant protection officers only as manpower that must be available to protect company property.

This negative approach has never been the philosophy of the Wolverine Tube Division of Calumet & Hecla, Inc. From the time the company opened its Decatur, Alabama plant in 1948 it decided that the protection personnel must serve as a positive force. Besides handling the routine protective functions of a guard, they would have to be public relations oriented. To ensure this, they added an extra qualification to the job requirements — "ability to meet the public."

Why did Wolverine consider this so important? Because the first Wolverine employee that visitors, salesmen and prospective customers meet on visiting the plant is the guard at the entrance. If he is rude and uncooperative, it is not unlikely that the visitor will feel those are the sentiments of the company. If on the other hand he is courteous and helpful when prospective customers enter the plant grounds, he can be the first link in the chain that creates sales.

Guards must also be public relations conscious when dealing with the company's employees. It is their function to check employee's leaving permits, package passes and lunch boxes. While this procedure is necessary to protect against petty theft, it is important that it does not create embarrassment for the employees. Tactful handling of this job by the guards at the gate can easily prevent such embarrassment.

Choice of Guards

Using the philosophy that a protection officer must do more than protect, Wolverine carefully screened all applicants for the job. The basic skills needed for the job were not forgotten either. It was decided that an eight man protection force was required to competently protect the nineteen buildings that make up the covered area of over ten acres. All of the eight men originally hired were experienced guards. One had been a deputy sheriff for eight years. Two others had been guards at the Redstone Arsenal. Another had patrolled the Huntsville Arsenal. Still another had been a watchman at Courtland Air Force Base.

The importance placed on obtaining the right personnel paid off. When Wolverine celebrated its tenth anniversary this year, five of the original eight protection officers were still with them. With these men acting as a permanent nucleus, Wolverine found it could hire replacements from within the company so that the new protection officers would already be familiar with the plant layout and company procedures.

Protection Procedures

Two protection officers at a time are on guard twenty-four hours a day. They are equipped with side arms and have been deputized by the sheriff of Morgan County. One maintains a post at the gatehouse by the entrance. Here he controls an electric gate which must be raised to allow anyone to enter or leave the plant grounds.

He is responsible for all inbound and outbound pedestrian and vehicular traffic. All visitors, truck drivers, salesmen and outside workers are registered upon arrival.

Plant Surveillance

The second guard in each shift is responsible for surveillance of the complete plant area. This includes the main office building, manufacturing buildings, engineering building, boiler house, technical building, and special aluminum plant located behind the main building. Each guard makes approximately 22 plant checks during his eight-hour tour.

When any violation takes place within the plant, the protection officers are responsible for reporting it to the plant engineer who is responsible for the plant services. If the violation constitutes a minor problem, it is handled by the plant engineer, but if it is of major significance it is reported to the factory manager.

In case of accident, the protection staff alerts the necessary medical personnel. All are familiar with first aid procedures and are capable of rendering assistance until qualified medical help arrives.

It is in the case of emergency that Wolverine is especially dependent on its protection officers. They operate the fire alarm systems and automatically serve in the fire brigade. They also operate the public address systems and are responsible for making sure all employees and visitors receive immediate warning if an emergency occurs.

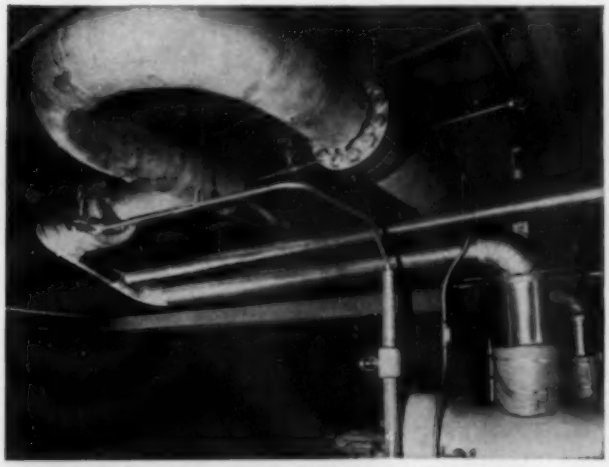
Kept Up To Date

Wolverine does not consider its protection force a section that is to be trained once and then forgotten. Company methods and procedures will be changed and improved, as necessary, to meet any new requirements.

25 YEARS* OF SATISFACTION with MIDWEST PIPING

That is the experience of THE HAWAIIAN ELECTRIC COMPANY

Of the eight piping contracts the Hawaiian Electric Company placed with Midwest during the past quarter century, two were for the L. A. Hicks Plant shown above.



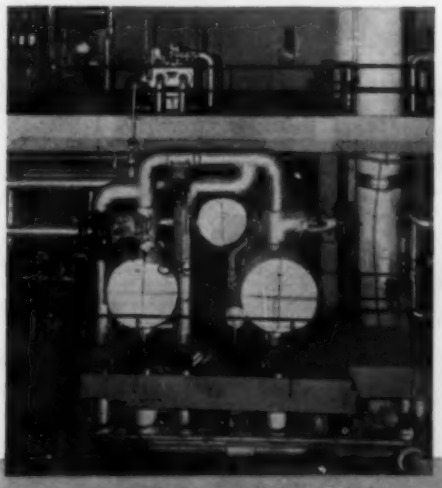
Boiler feed piping fabricated and installed by Midwest for the last unit in the L. A. Hicks Plant in Honolulu.

Benefits that Hawaiian Electric and many other electric utilities get by using Midwest Piping include:

- Unequalled experience of Midwest fabrication and construction organizations.
- Erection planning by staff engineers before fabrication.
- Accurately fabricated subassemblies that simplify and expedite field erection.
- Convenient locations of three fabricating plants.
- Continuous piping research and development.

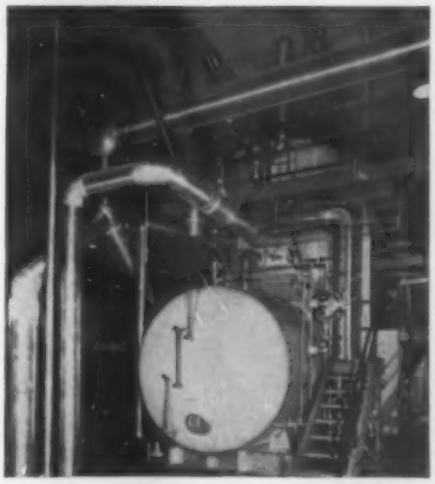
This adds up to a better piping job . . . on time and at minimum cost. It will pay you to call in Midwest the next time you need piping.

8
*** CONTRACTS SINCE 1933**



(Left) Showing Midwest Piping for horizontal and vertical feed water heaters for last two units at L. A. Hicks Plant.

(Right) Main steam and deaerator piping for last unit. Design conditions are 1500 psi and 950°F.



8093

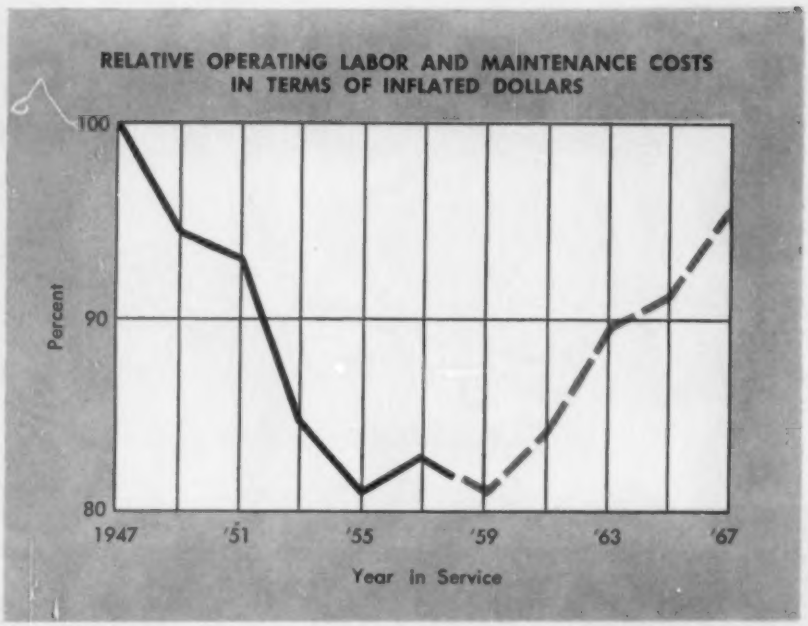
MIDWEST PIPING COMPANY, INC.

Main Offices: St. Louis 3, Mo. (P. O. Box 433)

PLANTS: ST. LOUIS, CLIFTON, N. J. and LOS ANGELES

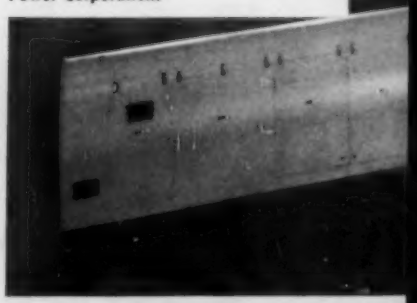
SALES OFFICES: Asheville (Box 446, Skyland, N.C.) • Atlanta 9—72 11th Street, Northeast • Boston 27—426 First Street
Chicago 3—79 West Monroe St. • Cleveland 14—616 St. Clair • Houston 2—1213 Capitol • Los Angeles 33—520 Anderson
Miami 34—2103 Le Jeune • New York 7—50 Church St. • Pittsburgh 19, Pa.—437 Grant • San Francisco 11—420 Market St.
St. Louis 4, Mo.—1450 South Second St. • Tulsa—1640 East 21st St.

MIDWEST PIPING SERVICE IS NATIONWIDE

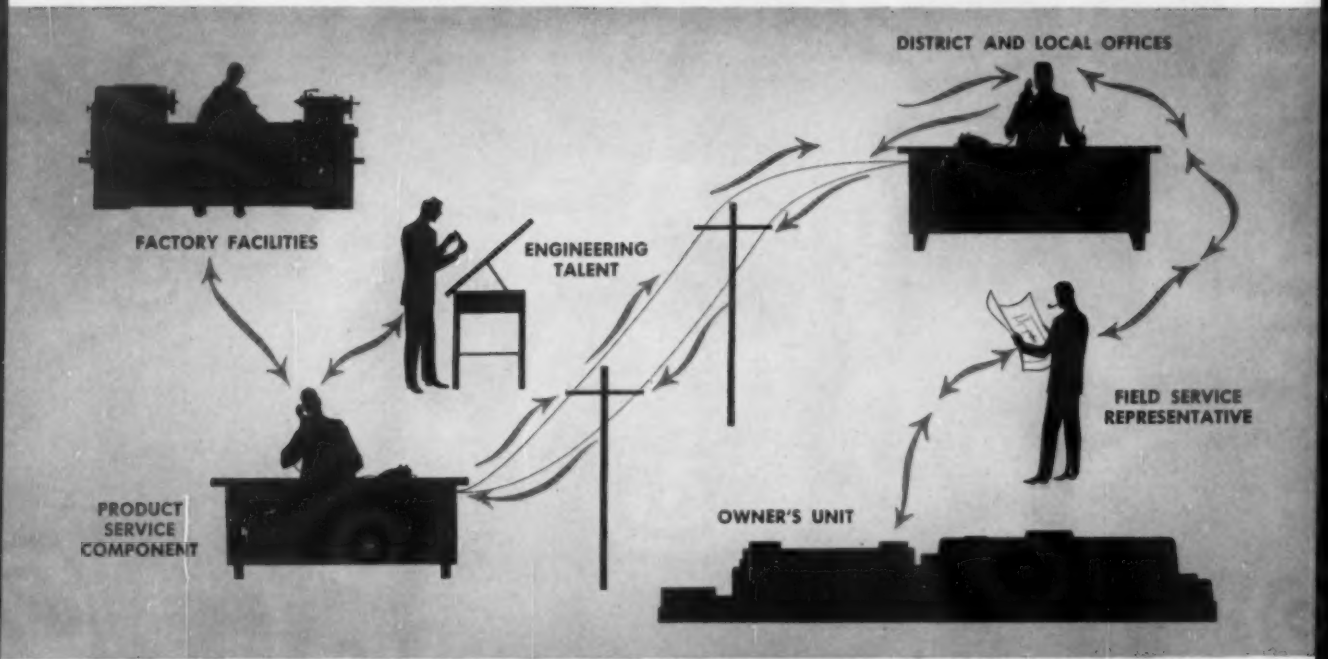


LARGER UNIT SIZES and improved heat rates have helped utilities reduce operating labor and maintenance costs. However, if these costs are projected at the 1947–57 inflationary rate, this trend will be reversed as indicated above. Accordingly, General Electric is constantly strengthening all phases of its present intensive efforts that help in *KEEPING POWER MAKERS ON THE LINE*, thereby promoting even more economical generation of electricity.

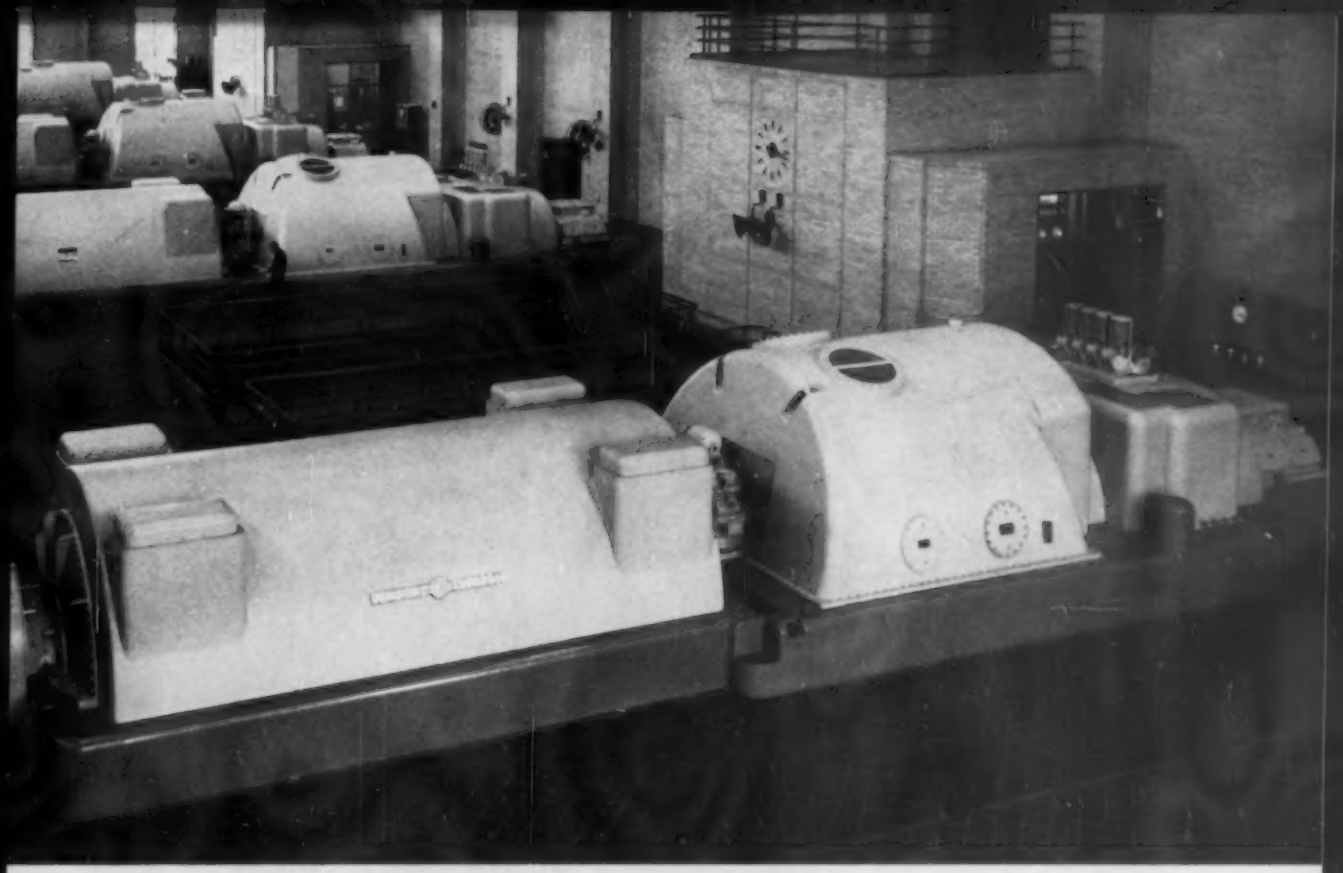
KEEPING POWER MAKERS ON THE LINE, operating at top efficiency is the job of over 400 G-E turbine-generator field representatives backed by well-rounded district organizations, and by complete manufacturing facilities and engineering talent at the factory. Pictured here are four General Electric units installed at the Albany Steam Station, Niagara Mohawk Power Corporation.



Completely integrated service helps keep



TWO-WAY FLOW OF SERVICE INFORMATION through the Product Service component enables factory "know-how" to supplement the efforts of your field service representatives, and permits design and manufacturing specialists to take full advantage of field operating experiences.



General Electric power makers on the line

From the time an order is placed, through design, manufacturing, installation, and during the life of every unit, a well-trained service team is constantly available. Turbine-generator field representatives and local specialists are backed by a Product Service organization at the factory. This component channels all incoming and outgoing information and coordinates the application of factory talents and facilities to individual owner's problems.

Here are some ways General Electric service helps maintain the product superiority built into each unit:

***Installation Service Study Team**—helps simplify field erection by continually studying methods for reducing installation time and cost. It also seeks easier inspection procedures by suggesting appropriate improvements in equipment design.*

***Performance Interpretation**—helps owners evaluate abnormal sectional pressures and efficiencies, loss of capacity, and other operating irregularities. General Electric initiates tests to prove new designs, and aids owners in conducting their own performance tests on duplicate machines.*

***Engineering Consultation**—is continuously available from factory components. Here electrical and mechanical engineers specialize in providing prompt supporting attention to problems that may arise during the life of your unit.*

***Materials and Processes Laboratory Assistance**—is offered for any unusual service requirement. Nearly 300 physicists, chemists, specialists and technicians are available for field studies, consultation, and advanced non-destructive testing.*

***Maintenance Task Force**—establishes procedures to speed repairs and minimize outages by: assuring efficient repair routines, carefully analyzing shop operations to eliminate uncertainties, and coordinating our action with owner's requirements.*

***Material Procurement Advantages**—help reduce maintenance downtime. Large volume production, a backlog of currently approved materials such as composite forgings, tubing, and bar stock, and an efficient purchasing organization constitute powerful aids in meeting emergency requirements.*

Complete service—designed to provide maximum assistance and satisfaction to the owner—is part of the "added value" you purchase with every General Electric steam turbine-generator. For more information, write for publication GED-3666, Large Steam Turbine-Generator Department, Schenectady 5, New York. 254-76

Progress Is Our Most Important Product

GENERAL ELECTRIC

Pensacola, Florida . . .

Handling Purchased Chips

UPPER PHOTO — Chips are carried from the new chip silos to the digester building at right by means of a series of 36-in. wide belt conveyors.

LOWER PHOTO — Chips are withdrawn from silos by 17 ft diameter rotary plate feeders, which discharge onto a belt conveyor system which carries the chips to top of digester building.

AN IMPORTANT trend in the pulp and paper industry in the South is the use of purchased chips from sawmills. Southern mills have recently augmented their supply of chips by means of a broad program designed to make use of slabs and edgings which were formerly wasted.

St. Regis Paper Company, in cooperation with sawmills, developed new methods for debarking logs before they were sawed, and then reducing the slabs and edgings to chips suitable for mills.

In addition the company has recently sponsored the installation of concentration yards where slabs and edgings can be debarked and chipped.

Pensacola Mill — The St. Regis mill at Pensacola, Fla., now receives a substantial portion of its chips by rail in hopper-bottom cars, and Link-Belt Company has installed an extensive chip handling system for unloading, conveying and storage of the chips.

Use of Hardboards — Because of the purchased chip program, the St. Regis plant has begun to use pulp from hardboards in addition to the southern pine for which it was originally designed. This has required the building of two large storage silos to supplement the storage bins above the digesters. Hardwood chips can be stored separately in case the digesters are processing softwood chips, or vice versa.

The new Link-Belt chip handling system includes a car shaker for unloading railroad cars, a track hopper, drag chain feeders beneath the hopper, conveying and elevating equipment to the new silos, and feeders and conveyors from the silos to the storage bins above the digesters.

The chip handling system also includes new belt conveyors from the chippers in the wood room to the new chip silos. The arrangement of conveyors and elevators permits chips from the chipper to be delivered either directly to the bins above the digesters or to the new storage silos, and chips received by railroad cars can be transported to the storage silos or directly to the digester bins.

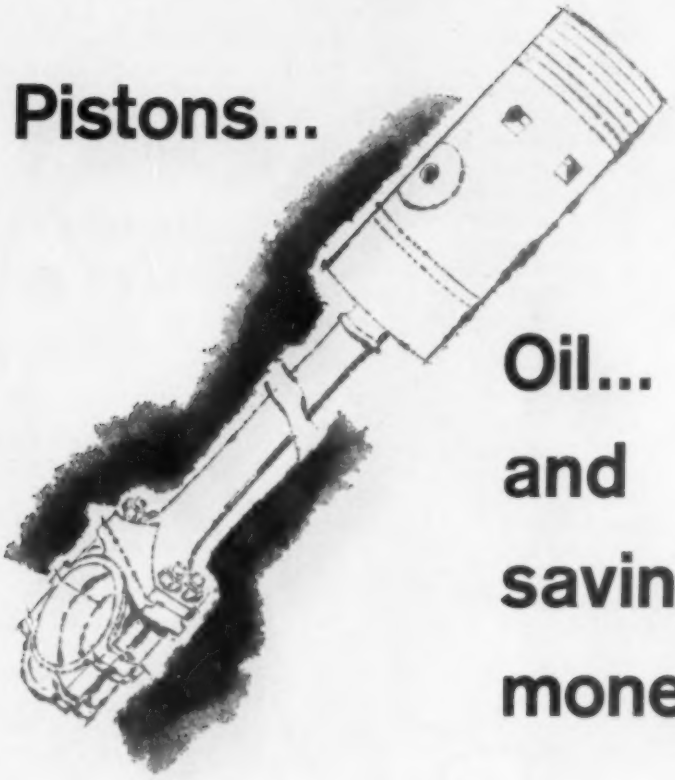
Each of the silos holds 260 cords (or 58,000 cu ft) of chips. The silos are about 68 ft high and 36 ft in diameter, except for the cone-shaped portion of the base.

The capacity of the conveyor system from the track hopper is 24,000 cu ft an hour and from the chippers is 48,000 cu ft an hour. Thus, it is possible to fill a silo in just 48 minutes if both systems are employed simultaneously.

The chip handling system has been designed for the addition of four more silos, two on each side of the present ones. The shuttle belt conveyors over the silos can be extended to serve these additional silos, and so can the collecting belt conveyors at the base of the silos.

Delivery of Chips — Chips are

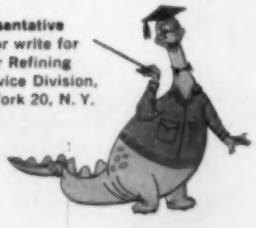
Pistons...



Oil... and saving money

The longer your pistons work before need of ring replacement—the less your cost of operation. Sinclair Rubilene® Oils have the reputation for giving longer service to cylinders, rings and other vital parts. Refill with Rubilene now. Next time management asks how you've cut costs, tell them you've switched to Sinclair—and show them the results.

Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.



SINCLAIR
Rubilene® Oils

purchased from sawmills within a radius of 150 miles from the Pensacola mills. They are carried to the mill in special highwall hopper-bottom cars with sides built up with steel to about 10 ft. Each car has a capacity of about 3,200 cu ft of chips. With the aid of the Link-Belt car shaker, six cars can be unloaded in an hour.

At the base of the track hopper, three banks of H-class drag chain conveyors, about 30 ft long and covering a total width of about 17 ft, draw the chips from the hopper and discharge them onto a 42-in. wide belt conveyor which delivers either to the bucket elevator serving the new chip silos or to the first of the belt conveyors leading to the digester building.

The centrifugal discharge bucket elevator is one of the biggest of its kind, handling 24,000 cu ft of chips an hour. It discharges onto a 36-in. wide reversible shuttle belt conveyor which delivers the chips to either silo. The shuttle belt conveyor travels along rails, permitting discharge over the end of the belt at the desired location. Since the belt is reversible, it can thus feed chips to either silo.

Chips from the chipper in the wood room are carried by a long, inclined belt conveyor, with 45-degree idler rolls for greater volume, to a second reversible shuttle belt conveyor, 48 in. wide, parallel to the first. The chips are withdrawn from the silos as needed by two Link-Belt rotary table feeders, each 17 ft in diameter.

The two rotary table feeders discharge onto two 36 in. wide belt conveyors which deliver at right angles onto a single belt conveyor. Three successive belt conveyors then carry the chips to the top of the digester building, discharging them onto a shuttle belt conveyor which distributes the chips to the chip bins over the digesters.

Blow-Off Valve Resists Throttling Wear

THE WORLD'S largest manufacturer of hardwood flooring, E. L. Bruce Company, with headquarters in Memphis, Tenn., has relieved its worst valve maintenance headache.

In the Bruce plant at Little Rock, Ark., the severe throttling service in a boiler blowdown line, caused leakage in about two weeks following valve maintenance and repair.

Early in 1955, the LQ600 bronze globe valve, a development of the Lunkenheimer Co., was installed in this service. Brinalloy, the new metal employed for seats and discs, is hardened all the way through, and is more resistant to wear and corrosion than 500 Brinell stainless steel.

Its unique flat-seat design was at first considered impractical for throttling service. But Brinalloy's resistance to wear and corrosion made it possible to fuse the seat and disc into the valve for its entire service life, eliminating replacement, or regrinding.

Since its installation over two years ago, the valve has never failed to close bottle-tight. It is rated at 150 lb, but replaced a valve rated at 350 lb in this service. The valve is never open more than ¼ turn and blows off steam and water continuously 24 hours a day, six days a week.

In service over two years without repair, where other valves lasted only two weeks.

Insulation Testing by D-C Methods

ENGINEERS concerned with insulation maintenance of important electrical apparatus will want to check a copy of the new James G. Biddle technical publication *Insulation Testing by D-C Methods.*

It discusses the basic principles involved and the various kinds of electrical apparatus which it appears can be effectively and economically tested by the step-voltage method. Consideration is also given to the interpretation of current and resistance measurements made at increasing direct voltages.

For your free copy write: James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa.

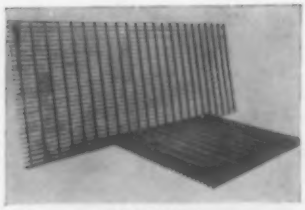
Track Inspection

PLANT engineers and maintenance personnel with the responsibility for inspecting and maintaining plant railroad trackage, sidings, etc., will find L. B. Foster's *Track Inspection Kit* of considerable help.

It provides a checklist for determining the general condition of the track installation and the specific areas which need correction or replacement and contains a 16-page instructional handbook on track maintenance. A special 11 x 18-in. card chart illustrates various types of track layouts — chart is keyed to photos of track components so that all parts can be easily identified.

For your free *Track Inspection Kit* write L. B. Foster Company, Box 1647, Pittsburgh 30, Pa.

Fractured round illustrates the fibrous structure of 4-D Wrought Iron. These iron silicate fibers provide built-in resistance to corrosion and fatigue stresses. This unique characteristic is duplicated in no other metal.



GRATINGS

LADDER STEPS

BLOCK RACKS

STACK SUPPORTS

PITTSBURGH—"A full line of 4-D Wrought Iron bars, rounds and angles is now available from A. M. Byers Company. Bars are available in lengths up to 30 feet. Orders will be shipped within 2 to 7 days after receipt in Pittsburgh."—*A. S. Chalfant, Vice President.*

To meet the expanding market applications of our specifiers, Byers is now geared for quick service on 4-D Wrought Iron bars and shapes.

Our company has *always* manufactured Wrought Iron bars and shapes in limited sizes. But increased demand for 4-D Wrought Iron in commercial, industrial, and residential specifications has prompted us to supplement our line even more fully.

4-D Wrought Iron's resistance to corrosion and fatigue stresses keeps maintenance at rock bottom. No costly repairs. No premature failures. Thus, users of this versatile material can look forward to long life installations at the lowest cost per year of service.

Availability of a full line of 4-D Wrought Iron bars, rounds and angles—with dependable, rapid-fire delivery—now enables specifiers to install complete jobs with this time-proven metal. Now, you need no longer use ferrous substitutes in such applications as: gratings, ladle stopper rods, mechanical shielding for nuclear reactors, manhole ladder steps, curing and process racks and bolts and brackets.

Ask the Byers representative for specific information. Or, write us for a prompt reply. A. M. Byers Company, Clark Building, Pittsburgh 22, Pa.

BYERS 4-D WROUGHT IRON

TUBULAR AND FLAT ROLLED PRODUCTS

ALSO AMBALLOY ELECTRIC FURNACE STEEL PRODUCTS AND PVC PIPE AND SHEET

Corrosion costs you more than Wrought Iron

Motor Driven Cutter

USING a hand-operated cutter to cut steel sections around the plant was a slow technique that involved irksome time-wasting toil. This was eliminated by powering the knife with a 1 hp motor, which operates an eccentric driving a spring-loaded plunger.

The other end of the plunger is toothed to engage the teeth on the quadrant attached to the knife, and a platform at the rear of the table holds an adjustable stop which can be set to determine the length of the cut.

The machine requires little labor and far exceeds the production that was ever possible with the hand style cutter.

By STANLEY CLARK
East Bradenton, Fla.

Why Use D-C?

TODAY'S growing use of d-c power can be attributed to a number of factors but a major determinant is the advent of automation. Operations in nearly every plant are being studied to determine if they lend themselves to automatic techniques.

Why use d-c? Greater flexibility, responsiveness and a wider control range are the inherent advantages of d-c that lend themselves to automatic processes.

Through various systems it is possible to control almost any production process with d-c power. Increased output, better quality control and product flexibility result from its application; and these help to lcwer the cost per unit of production.

Although the use of direct current is new to many automatic drive applications, it is not new in the electrolytic and transportation fields. All electrolytic processes require large amounts of d-c for obtaining products from a cell or bath through which an electric current is passed. This includes the production of such chemicals as chlorine, hydrogen, oxygen, perchlorate and such metals as aluminum, copper, magnesium, and zinc.

Power for transportation is predominantly d-c. Trolley cars, subways and interurban trains provide a rapid means of transportation in metropolitan areas by utilizing the high-torque characteristics of d-c motors.

Conversion — There are several types of conversion equipment to meet the growing need for d-c power in industry. Of these, the mercury-arc rectifier is a prominent leader at the present time. Although the mercury-arc rectifier has been known for fifty years or more, its real growth has taken place in the last twenty years.

A typical industrial design permits the substation to be located in the load area. In electrochemical applications, the a-c switchgear and transformer are normally located outdoors while the anode and cathode switchgear and rectifier are arranged in a package for location indoors.

Adapted from General Electric's Bulletin GEA-6849 — Pumpless Mercury-Arc Rectifier Equipment.

Nuclear Fuels . . .

A new booklet — **Nuclear Fuels: Key to Reactor Performance** — will bring you up-to-date on principal reactor components and their functions; reactor fuels, including solid fuel elements, liquid fuels, fuel element composition and design; and recently built reactors and their fuels. For your free copy of the 24-p two color, illustrated booklet write: Sylvania-Corning Nuclear Corp., Bayside, New York.

Superheater Care Prevents Tube Failure

THE INTEGRAL type of superheaters on boilers presents the problem of keeping these tubes clean, especially during a scheduled shutdown, clean out and startup period.

We have evolved a procedure that we think assists in keeping superheater tubes operating satisfactorily. We have not lost a superheater tube the past four (4) years.

Temporary piping connections are made between the end of the superheater header and the con-

densate return system previous to a planned shutdown. When the boiler pressure is released upon shutdown the superheater tubes are flushed with 350 F condensate. Flushing is repeated three times in an hour.

We theorize this procedure has multiple benefits; (1) it helps to clean the tubes by dissolving small amounts of carry-over during the year's run; (2) it leaves an essentially mineral-free liquid in the tubes and evaporation of a portion of this liquid from heat remaining will not leave scale in the tubes; (3) liquid left in the tubes is nearly neutral and helps to minimize any reaction while acidizing the boiler.

A superheater tube from each of two boilers was lost during the first week of operation after start-up following cleanout one year. Sludge and resultant scale trapped in the bend appeared to be the cause.

Since that experience we have used condensate to flush the superheater tubes when the boiler is ready to start up. At the same time each superheater tube is checked for positive circulation from the firebox side of the tubes, by actually feeling each element.

It is theorized that this procedure flushes the tubes and leaves clean liquid in the tubes during the evaporation process on start-up, which helps prevent scale formation in the superheater tubes. Samples taken from superheater elements have given test results that verify our theory.

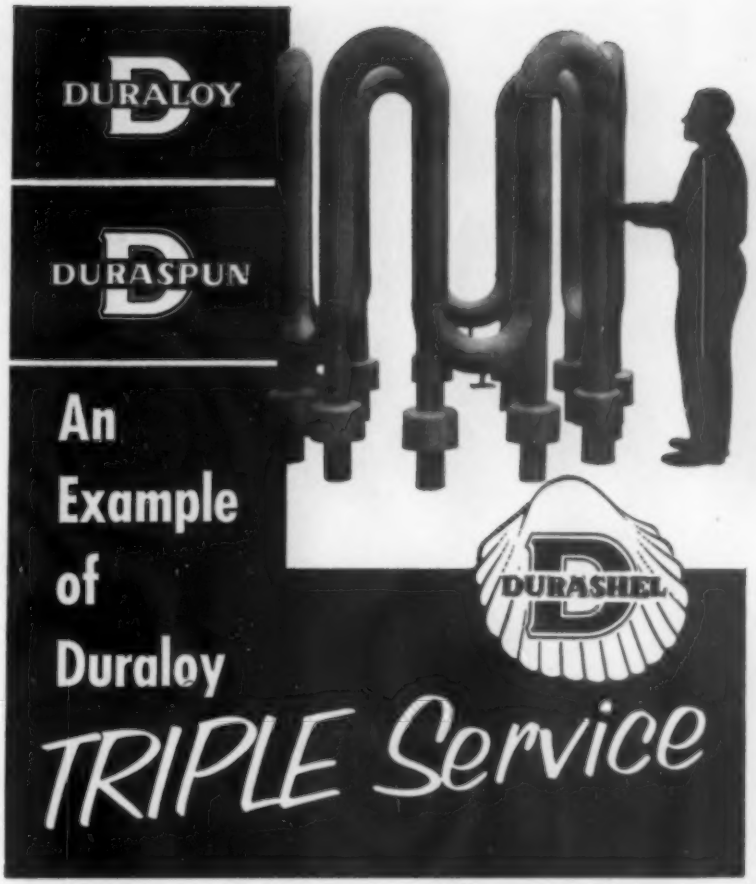
B. H. MYLIUS, Area Supt.
Cit-Con Oil Corp.
Lake Charles, Louisiana

SPI . . . 56th Year

REACHES industrial plants (manufacturing, process, utility and large service) in the South & Southwest.

SERVES plant managers, superintendents, engineering department heads and plant operating staffs.

PROVIDES information to solve design, installation, operating and plant maintenance problems.



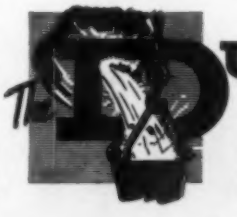
This photograph of an 'immersion type radiant heater' shows a welded assembly of:

1—static castings (collars)
2—centrifugal castings (straight pipe sections)
3—shell molded castings (bends)

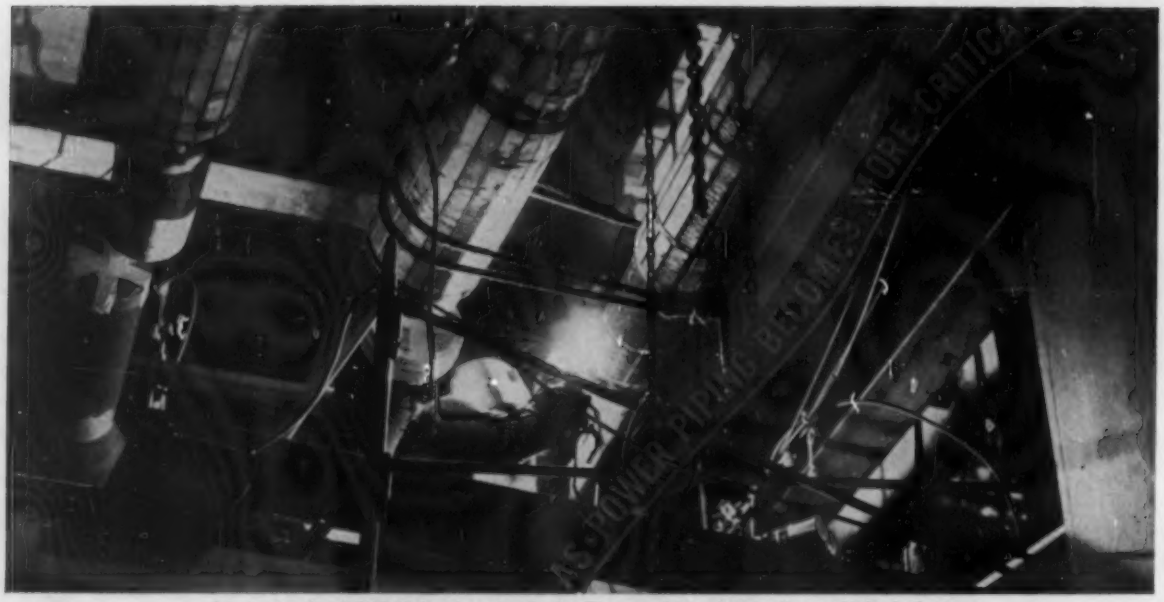
This unit provides an excellent example of our broad TRIPLE Service.

Our experience in static high alloy castings began in 1922; in centrifugal castings, in 1933; in shell molded castings, in 1955. Thus, in this radiant heater, the old blends with the new. It's an excellent example of the kind of work we do.

If you want your high alloy castings alloyed by specifically experienced metallurgists and cast by specifically experienced foundry men . . . those who work exclusively along these lines . . . Duraloy should be your choice.

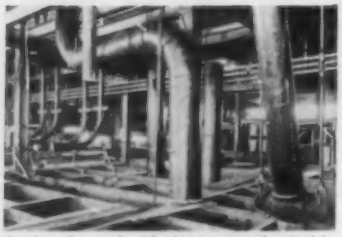


DURALOY Company
OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.



A main steam line is K-Welded to the mixing header. There are eight main steam lines to this header from the boiler, and four from mixing header to turbine. With inside diameters up to 4.938 in. and minimum wall thicknesses as much as 2.860 in., sections weigh four to five tons. Main steam header weighs over ten tons.

KELLOGG'S FIELD WELDING KEEPS PACE



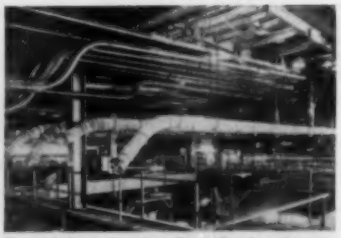
Section of second cold reheat system (center) in process of being positioned, with section of first cold reheat system (right) partially in place. Four boiler feed risers at left.

General view inside Eddystone Station, eleven floors high, showing high pressure boiler feed water risers (top and center) as these were being erected by Kellogg.

During erection of Philadelphia Electric Company's Eddystone Station, Unit No. 1, *eighty* K-Welds® . . . Kellogg's inert gas shielded technique of manual arc welding . . . will be made by Kellogg on the Type 316 stainless main steam lines alone. Following Kellogg's shop fabrication procedures on this job, every K-Weld will be given a total of *four* inspections by liquid penetrant and radiography during welding and after heat treatment.

Time required to finish and inspect each weld completely on this supercritical, heavy-walled piping is *eight to ten working days*. Further evidence of the magnitude and complexity of Kellogg's erection and welding assignment is provided by these construction photographs.

Kellogg welcomes inquiries on its complete service to the power piping industry from consulting engineers, engineers of power generating companies, and manufacturers of boilers, turbines, and allied equipment.



Four of the main steam lines, showing the protective wood lagging installed at Kellogg plant. This is not removed, except at welding points, until insulation is applied.

Six of the eight special high pressure valves being installed by Kellogg at the Eddystone Station—Philadelphia Electric Company's new supercritical steam power plant.

Fabricated Products Sales Division, THE M. W. KELLOGG COMPANY, 711 Third Avenue, New York 17, N. Y.

A SUBSIDIARY OF PULLMAN INCORPORATED

The Canadian Kellogg Co., Ltd., Toronto • Kellogg International Corp., London • Kellogg Pan American Corp., New York
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POWER PIPING—THE VITAL LINK

® *Registered trademark of The M. W. Kellogg Company*

Southern News Briefs — Continued from Page 16

Curt Pearson & William Colvin

Texsteam — Houston

The division of the sales function of the **Texsteam Corporation** of Houston into two sections with a sales manager having responsibility for specific product lines in charge of each has been announced.

Curt T. Pearson, formerly assistant sales manager of the company, has been appointed Sales Manager of the Heater and Steam Generator Division. Products assigned this division include the Coil-N-Shell, Vapor Modulatic, and Tex-Steamer type packaged steam generators. Also included are bottom hole heaters, crude oil heaters, asphalt heaters, steam cleaners, gas dehydrators, skid fabrications, and all related parts and accessories. Mr. Pearson has been associated with the company since 1952.

William B. Colvin, appointed Sales Manager of the Pump and Valve Division, assumes responsibility for the sale of chemical pumps, Tex-Lift hydraulic oilwell pumps, safety and relief valves, Graham non-lubricated plug valves, tank patches, hydrogen probes, and all related spare parts and accessories. Mr. Colvin has been associated with Texsteam Corporation as Public Relations Manager since 1957.

G-E Air Cond. Dept. Moved to Tyler, Texas

C. A. Salmonsen, general manager of the Air Conditioning Department for **General Electric,** has announced the location of Department headquarters at its new fifteen million dollar home cooling plant in Tyler, Texas.

The General Electric Air Conditioning Department manufactures central heating and cooling equipment for the home, office, store and factory. Its complete range of cooling equipment extends from 2½ to 30 tons in both packaged units and split systems.

Salmonsen indicated that manufacturing facilities at the Bloomfield, N. J. plant would continue. The Bloomfield plant manufactures packaged air conditioning units for commercial and industrial use. In addition to the Tyler and Bloomfield facilities, the Air Conditioning Department also has a manufacturing plant in Trenton, N. J., where gas and oil furnaces are in full production.

Announcing the transfer of Department personnel to Tyler, he listed the appointments of individuals heading up the Department's five major functions: **R. F. Hertel,** Manager-Engineering; **W. J. McCullough,** Manager-Finance; **H. W. Pierce,** Manager-Public & Employee Relations; **C. B. Ramsdell,** Manager-Marketing and **T. Sproule,** Manager-Manufacturing.

American Viscose Personnel Changes

Nicholas E. Carr, manufacturing superintendent of the Fredericksburg, Virginia plant, has also assumed the duties of assistant plant manager.

Alvin K. Barbour is now industrial engineer at the company's Nitro, West Virginia plant. **J. F. Murrin** is Nitro plant manager.

William E. Paul, formerly power house superintendent at Roanoke, Virginia, has moved to the Marcus Hook, Pa. cellophane plant in the same capacity.

William W. Keith, former maintenance engineer at the Roanoke, Virginia plant, has been named to this position at the Fredericksburg, Virginia cellophane plant.

Dixie Bearings — Parker Seal Distrib.

Granting of a franchised distributorship on industrial Gask-O-Seals for pipe flanges and industrial Stat-O-Seals for bolts and other fasteners to **Dixie Bearings, Inc.,** 276 Memorial Drive Southwest, Atlanta, Georgia, has been announced by **Parker Seal Co.,** a division of Parker-Hannifin Corporation, Cleveland, Ohio and Culver City, California.

According to **E. F. Brown,** vice president of Dixie, stocks of the new type seals for prompt handling of customer requirements are being established also in all Dixie branches located at Jacksonville, Louisville, Baton Rouge, New Orleans, Charlotte, Greensboro, Greenville, Chattanooga, Kingsport, Knoxville, and Nashville.

Dixie Bearings, having been appointed a year ago, continues as an authorized distributor of Parker synthetic rubber o-rings. Providing technical assistance to the distributor branches as necessary are **R. R. Braucher,** Parker Seal Company representative for the Southeast; **W. E. Swan,** representative for the Cincinnati district which includes Kentucky; and **J. G. Oechsner** covering the Houston territory which includes Louisiana.

Atlas — South

Atlas Valve Company, 280 South Street, Newark, New Jersey, a leading manufacturer of automatic pressure, temperature and level controls for the marine, power, chemical and petroleum processing fields, has announced four new sales representatives to cover the states of North and South Carolina, Louisiana, Mississippi and Florida.

R. L. Crane, 1332 Lafayette Avenue, Charlotte, N. C., will cover the Carolinas and **Weedon Engineering Company,** 6824 Atlanta Road, Jacksonville, will represent Atlas in Florida. **W. C. Christianson,** 129 Texas Avenue, Jackson, Mississippi, will cover that state and in Louisiana Atlas will be represented by **Moore Instruments, Inc.,** 511 Broadway, Houston, Texas.

A-C — New Orleans

William Kendall, a sales representative in the Charlotte district of **Allis-Chalmers Industries Group** since 1956, has been transferred to the firm's New Orleans district.

Kendall has been associated with Allis-Chalmers since 1955. He is a mechanical engineering graduate of North Carolina State College.

Southern News Briefs (Continued)

Trabon Engineering

Dudley C. Jackson, Box 7407, Birmingham 13, Alabama, has been designated as the exclusive **Trabon Engineering Corp.** distributor for states of **North Carolina, South Carolina, Alabama, Georgia, Tennessee** and most of **Mississippi.**

Mr. Jackson has over 20 years experience in every industrial phase of centralized lubrication. He originally started in the assembly room where the component parts of the Trabon System are made. From there he moved up and became Service Manager and trouble-shooter for Trabon around the country. For eight years, he was in charge of Trabon's Chicago operations.

Trabon Centralized Lubricating Systems (the positive single line progressive system) deliver an exact amount of grease or oil to many bearings from one central location.

Olin Aluminum — Fla.

Caulley Steel and Supply Company, Fort Lauderdale, Fla., has been appointed a distributor for Olin Aluminum. Olin Aluminum is the trade name for aluminum produced by **Olin Mathieson Chemical Corp.**

Caulley Steel and Supply Company will distribute Olin Aluminum products in Central and Southern Florida. As operator of its own 10-truck fleet, the company is able to give distributors in their area one-day service.

In 1956, Caulley constructed a new general office and main warehouse in Fort Lauderdale. Branch offices and warehouses are located in Miami and Orlando.

Lima Register — S. W.

Appointment of the **J. P. Ashcraft Company, Inc.,** 5643 Dyer St., Dallas, Texas, as a manufacturer's sales and warehousing representative for **Lima Register Company** in the North Texas and Oklahoma area, has been announced.

Phil Ashcraft is the owner-manager of the Dallas, Texas, firm which has branches in Ft. Worth and Lubbock, Texas; Shreveport, La., and Oklahoma City, in addition to its main office and warehouse in Dallas. He is a veteran heating and air-conditioning sales-service engineer in the Northern Texas area — with more than 20 years' previous experience in the field.

The Ashcraft Company has a staff of 10 salesmen; also handles Carrier, Peerless, Taco, McQuay, and other leading heating, air-conditioning and related equipment lines. Lima Register Company, manufacturer of registers, diffusers, and grilles, has distribution throughout the U.S.A. and Canada.

Shell — Houston

Shell Chemical Corporation will begin construction of a phenol unit at its Houston plant early in 1959.

Most of the unit's production will be used to manufacture Bisphenol A, one of the two principal ingredients in the company's Epon resins, according to **C. W. Humphreys,** manufacturing vice president. Shell Oil Company also will take a share of the phenol.

The unit, which is scheduled to be completed in late '59, will produce acetone as a co-product.

Research — Cottrell

James M. Knox has been elected president of **Research-Cottrell, Inc.,** Bound Brook, N. J., leading manufacturer of industrial gas cleaning equipment and specialists in industrial gas handling.

The retiring president, **Carl W. Hedberg,** will continue as a director of both **Research-Cottrell** and the parent Research Corporation.

Cleaver-Brooks Acquires Springfield

Cleaver-Brooks Company, originator and a leading manufacturer of packaged boilers, has acquired the 68-year-old **Springfield Boiler Company,** Springfield, Ill. The transaction necessitates the investment of $1 million by Cleaver-Brooks, $500,000 for the purchase of the business with an additional $500,000 to cover working capital requirements.

In the past, Cleaver-Brooks has concentrated on the production of packaged fire tube boilers for process and comfort applications in a range up to 20,000 lb/hr. Through the Springfield water tube boiler lines, package plants now range to 50,000 lb/hr and up to 300,000 lb/hr for field erected units.

Sthrn. Distr. Mgr. for Cleveland Tramrail Div.

Don B. Hooser has been appointed Southern District Manager of the **Cleveland Tramrail Division.** The Cleveland Crane & Engineering Co., Wickliffe, Ohio, manufacturers of overhead materials handling equipment.

He succeeds **William P. Hanks** who now is Midwestern District Manager.

Mr. Hooser formerly was associated with Cleveland Tramrail Texas Company, Dallas, Texas, and is thoroughly familiar with the sales, application and servicing of Cleveland Tramrail equipment.

VEPCO — Virginia

Virginia Electric and Power Company has announced the election of **B. J. Dorsey** as Vice President of the Northern Division, to succeed John W. Howard, who recently retired.

Bunting Brass — Sthw.

Robert F. Hawkins of Cincinnati will represent **The Bunting Brass and Bronze Company** in the Southwest, handling sales engineering operations in Texas, Oklahoma, Louisiana, Mississippi and Arkansas. He will headquarter in Dallas, Texas.

arctic or tropic

POWELL

has the right valve!

Handling fluids at sub-zero temperatures or at super-heat – or any of the temperatures in between – is no problem if you install Powell valves. There is a Powell Dependable Valve to meet your most exacting flow-control requirements, no matter what the extremes of your needs.

The complete Powell line includes all types of valves in bronze, iron, steel and corrosion resistant metals and alloys, for pressures from 125 to more than 2500 pounds W.P. Consult your local distributor (there's one in most major cities) or write to:

The Wm. Powell Company • Cincinnati 22, Ohio

Dependable Valves Since 1846

Fig. 11303 W. E.: Steel O. S. & Y. pressure seal gate valve for 1500 pounds W. P. at high temperatures. Powell pressure seal valves are available for working pressures from 600 through 2500 pounds.

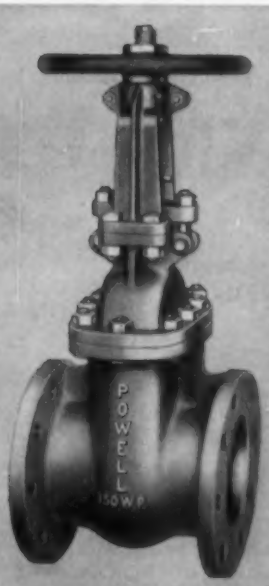


Fig. 86190: Steel union bonnet globe valve for 400 W.O.G. Designed for liquified petroleum gas service.

Fig. 2453G: Large 150 pound stainless steel O. S. & Y. gate valve for low temperature service. Can be furnished with interchangeable solid or double wedge disc.

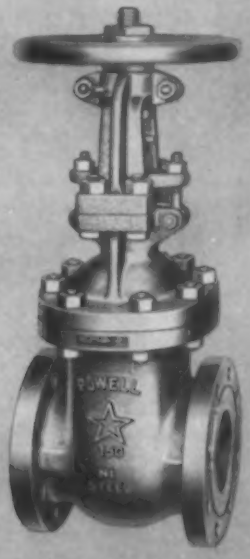


Fig. 1503 Mod.: 3½% Nickel-steel O. S. & Y. gate valve for low temperature service.

POWELL...world's largest family of valves

Southern News Briefs (Continued)

Berry Hydraulics

A new southern district sales office of **Berry Hydraulics,** a division of Oliver Tyrone Corporation, has been established at the factory located in Corinth, Miss. **H. S. Cain,** formerly of Pittsburgh, is district sales manager in charge of the Corinth office.

General sales offices will be maintained in the Oliver Building in Pittsburgh under the direction of C. R. Taylor, manager of sales engineering.

Mr. Cain has been with the company four years, was formerly in charge of the Houston, Texas, district office.

Berry Hydraulics is a major producer of hydraulic pumps, motors and transmissions. Its rotating piston units are used in a variety of heavy-duty applications with principal sales being in the gas transmission, lumber manufacturing and general industrial fields.

Eclipse Purchases Norwalk Valve

Purchase of **Norwalk Valve Company,** South Norwalk, Connecticut, has been announced by A. Campbell Perks, president of **Eclipse Fuel Engineering Company,** Rockford, Illinois. The 80-year-old Connecticut firm has been a leading manufacturer of gas pressure and control equipment.

Included in the purchase were all the machinery and the complete product line consisting of: Norwalk and Connelly valves, regulators, governors, filters, and gauges.

Machinery, tooling, engineering files, and inventory are being moved to the main Eclipse plant in Rockford. Manufacturing and sales activities will be carried on under the designation of Norwalk Valve Division, Eclipse Fuel Engineering Company.

Dravo — SW

The **Houston Company,** 3714 43rd Street, Lubbock, Texas, manufacturers representative, has been appointed distributor of Dravo heating equipment for a territory which includes 68 counties in Texas and 5 counties in New Mexico. **Dravo Corporation,** Pittsburgh, Pa., is one of the world's largest manufacturers of industrial and commercial warm air space heating and process drying equipment.

The Houston Company will sell Dravo's complete line of oil and gas fired units. These include the **Counterflo, Paraflo** and Gas-Fired suspended type heater models, covering a range of capacities from 40,000 to 2,000,000 Btu per hour output.

Automatic Trucks — Tex.

Garrett Equipment Company's appointment as new franchised representative in Dallas, Texas, has been announced by the **Automatic Transportation Company** of Chicago.

The Garrett Co. will handle both sales and servicing for the northern half of Texas including major cities of Dallas, Fort Worth, Lubbock, Tyler, Waco and Wichita Falls, covering the complete line of industrial lift trucks built by Automatic.

W. Y. Garrett, owner, has been associated with the material handling business for 16 years and has successfully guided the company under its present name for the past 9 years. He is now serving as a director of the North Texas Chapter of the American Material Handling Society.

Rawlplug — Dallas

Appointment of **Jack Grattan** as manager of the **Rawlplug Dallas Company** has been announced by A. J. McEwan, vice president-sales for The Rawlplug Company, Inc.

Grattan had been dealer service representative for Janney, Semple, Hill & Company in Minneapolis since 1956, after ten years as salesman for the company.

The Rawlplug office at 1016 South Lamar Street, Dallas 2, Texas, sells Rawlplug masonry anchoring products through wholesale distributors supplying the electrical, industrial, hardware, and construction fields in the northern half of Texas.

Pangborn — Augusta

The appointment of **Leonard W. Wagner** as Augusta District Manager has been announced by **Pangborn Corporation,** Hagerstown, Md., manufacturers of abrasives, blast cleaning and dust control equipment. In his new position, Mr. Wagner will direct overall sales activities and field engineering services from the district headquarters at 1317 Buena Vista Road, Augusta, Ga.

Atlanta Warehouse for Jones & Laughlin

The Wire Rope Division of **Jones & Laughlin Steel Corporation** has opened a new warehouse at 520 Permalume Place, N. W., Atlanta 18, Georgia. It is a consolidation of the J&L Wire Rope Division's warehouses in Savannah, Ga., and Birmingham, Ala. and will serve customers in Georgia, Alabama, South Carolina, Florida, and part of Tennessee.

The new warehouse, which contains 7,500 sq ft, will handle the full line of J&L wire rope products. A Fitted and Spliced Department will be added in the near future. **Kenneth E. Adams,** formerly Warehouse Supervisor at the Savannah Warehouse, will hold a similar position in Atlanta.

Anaconda Wire — Ala.

Anaconda Wire & Cable Co. has opened a district office at Room 2307 Comer Bldg., 2026 Second Ave., North, Birmingham 3, Ala. The office will serve the states of Alabama, Central Tennessee and Western Florida.

Bryn W. Waters is District Manager, assisted by **Stewart M. Graham.**

Ebasco Services

Richard M. Bush has been appointed a senior consultant on the Washington, D. C. staff of **Ebasco Services Incorporated.** Prior to joining Ebasco, Mr. Bush spent 16 years with the U. S. Army Corps of Engineers, serving in Washington as Chief of its Power Branch since 1955.

Announcing . . .

the NEW *Continental* HOT WATER AUTOMATIC BOILER

Shown for the first time at the ASHAE Show in Philadelphia January 26-29

Here is a completely new approach to Hot Water Boiler design. Continental gives you all the features you want for efficiency . . . for economy . . . for low maintenance costs. Check these performance advantages:

- In the history of package boilers, there has never been a single case of damage due to "thermal shock" with the Continental Boiler.
- Operates at high or low water differential temperatures . . . at high or low rates of water circulation . . . responds rapidly to temperature controls.
- May be used for either direct or reverse flow.
- Has internal expansion space to cushion the dynamic surge of circulators and eliminate entrapped air from system water.

For complete engineering data on the new Continental Hot Water Automatic Boiler, see the Continental representative or write for Bulletin BE-200.

BOILER ENGINEERING & SUPPLY CO., INC.
Phoenixville, Pa.

Southern News Briefs (Continued)

New Gen. Sales Mgr. for Belmont Packing

The **Belmont Packing & Rubber Company** has announced the appointment as General Sales Manager of **Walter W. Rooney,** formerly with Greene Tweed and Co. Mr. Rooney will continue to advance sales of the broad Belmont Line of Mechanical Packings and Teflon Specialties exclusively through Industrial Distributors — a field in which he has had many years of valuable experience.

Parker Seal — South

Appointment of **Owen-Richards, Inc.,** 824 North 31st Street, Birmingham 4, Alabama, and an associated firm, **Bearings & Transmissions Supply Co., Inc.,** Congress at Broad, Mobile, Alabama, as authorized distributors of Parker synthetic rubber o-rings for sealing applications, has been announced by **Parker Seal Co.,** a division of Parker-Hannifin Corp.

According to **William Spencer, III,** president of the distributing firms, both outlets will carry extensive stocks to assure prompt handling of customer requirements. **Joe H. Hamner** heads the Mobile company which has a branch operation in Pensacola, Florida. Technical assistance on sealing design problems will be extended to the distributors' customers as needed by **R. R. Braucher,** Parker Seal Co. representative in the Southeast.

Cameron & Barkley Exec. Promotions

The election of **Rufus C. Barkley** to Chairman of the Board and of **Edward J. Fitzgerald, Jr.** to President & General Manager has been announced by **The Cameron & Barkley Co.**

Mr. Barkley represents the third generation of Barkleys to head up the Company and his entire business career of more than 36 years has been entirely devoted to Cambar. The grandson of Rufus Calvin Barkley, one of the founders of the Company, Mr. Barkley joined Cambar in 1922, was elected to the office of Vice President in 1927 and succeeded his father, Matthew B. Barkley, as President in 1933.

Mr. Fitzgerald joined Cambar in July, 1956 after five years with the Wix Corporation and its subsidiary, Carolina Metal Products, where he served as Assistant General Manager in Charge of Production and Sales. He began his career at Cambar as Sales Executive, was promoted to General Manager in March, 1957, and was elected Executive Vice President and General Manager in December, 1957. He has engineered the tremendous expansion program, the most progressive in Cambar's 93 years of service to the growing South, which has seen new branch facilities erected in Savannah, Ga., and Mulberry, Fla., and the opening of a branch at Cocoa Beach, Fla. Plans call for additional locations and a combined, modern central warehouse and headquarters building.

The Cameron and Barkley Co., Southeastern distributors of industrial supplies and machine tools, maintain Executive Offices and central warehouse in Jacksonville, Fla., with branches in Charleston, S. C., Savannah, Ga., and Jacksonville, Miami, Orlando, Tampa, Cocoa Beach, and Bartow-Mulberry, Fla.

713-7

Safe Operation Of

OVERHEAD VALVES

with a

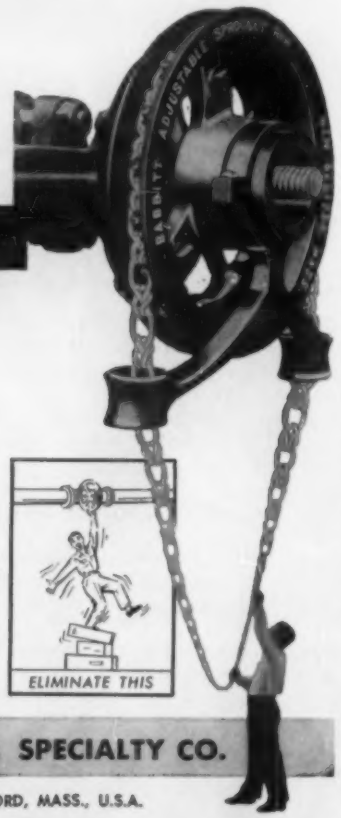
Babbitt

Adjustable

SPROCKET RIM

with Chain Guide

- Simplifies pipe layout
- Fits any size valve wheel
- Easy to install and operate
- Operates any valve from plant floor
- Time and money saving fixture
- No maintenance; first cost *only* cost
- Packed, completely assembled, one to a carton
- Hot galvanized, rust-proof chain available for all sizes
- Easy to follow instructions with each unit
- Your supplier carries complete stocks
- Write for new descriptive catalog sheet and prices



Babbitt **STEAM SPECIALTY CO.**

3 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

Barium Reduction Acquired by P.P.G.

The **Pittsburgh Plate Glass Company,** in exchange for shares of its stock, has received all the assets of **Barium Reduction Corporation,** South Charleston, West Virginia.

Columbia-Southern Chemical Corporation, wholly-owned subsidiary of Pittsburgh Plate Glass Company, will manage and operate this facility for the parent company. Columbia-Southern is a major producer of soda ash, chlorine, caustic soda, and related chemicals. The company operates ten plants throughout the United States and Canada.

Barium is a manufacturer of barium chemicals, related by-products, and carbon bisulfide. Principal customers are the glass and ceramic, paper, leather, rayon, and petroleum industries, and the general chemical industry.

Sales of barium chemicals and by-products will be handled by the Columbia-Southern sales organization. The Barium product line, generally, is sold to the same customers who use Columbia-Southern's major products.

J & L — Midland, Tex.

Jones & Laughlin Steel Corporation has opened a Resident Sales Office at 108 Arlen Building, Midland, Tex.

R. E. Schrock, Sales Representative, and **Richard L. Tuck,** Field Engineer, both will be attached to the new office, which is under the direction of **D. M. Griffith,** J & L's Houston District Sales Manager.

Flodar — South

The **Flodar Corporation,** Cleveland, Ohio manufacturers of tube and pipe fittings, have announced the appointment of **DeShanzo & Associates, Inc.,** 107 Broadway, Birmingham 9, Alabama. The new firm, which specializes in the field of hydraulic control devices, will assign three sales engineers to contact users in Alabama and Northwestern Florida.

Foreign Generators Approved for T.V.A.

The spending of more than $2,500,000 for the purchase of three generators from a foreign country by the Tennessee Valley Authority was severely criticized by officials of Allis-Chalmers Manufacturing Company, which quoted the lowest bid of American firms.

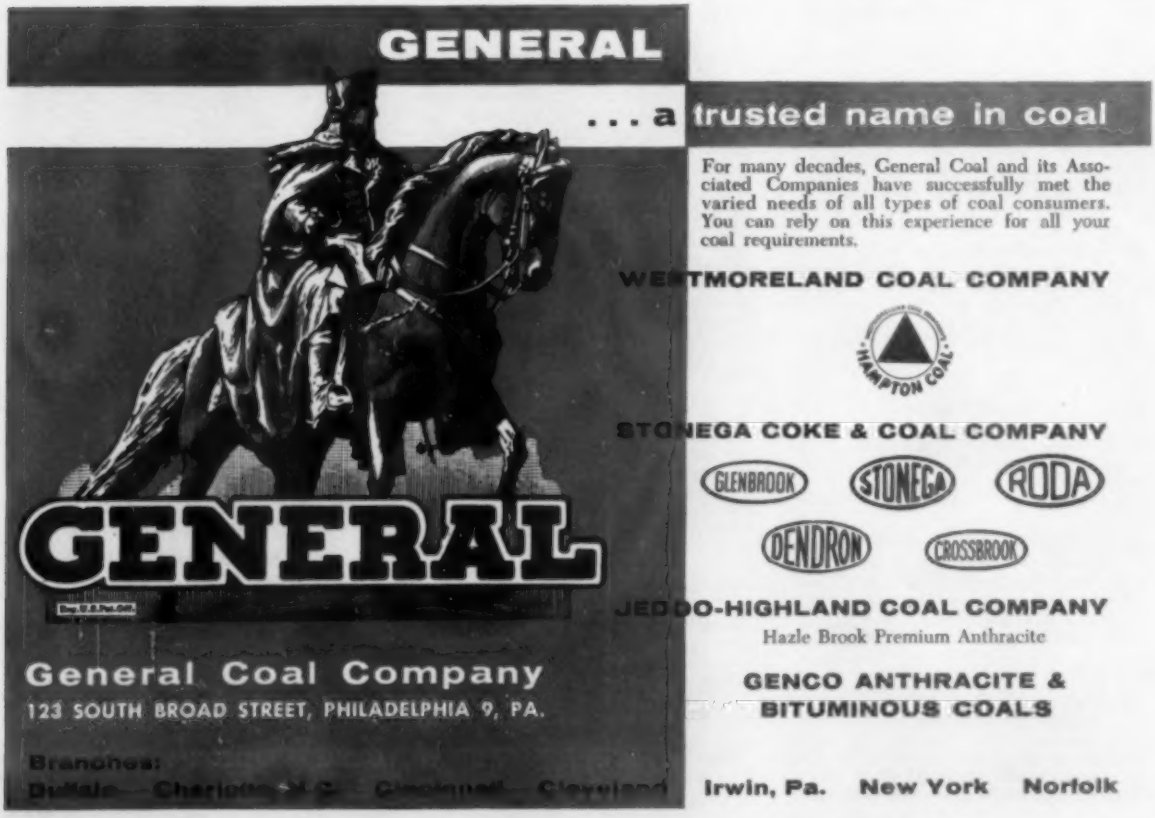
The Authority recently announced the results of bids received for three 60,000 kilowatt generators to be installed in Wilson Dam near Sheffield, Alabama. There are three foreign bids and three American bids. Tennessee Valley Authority's engineers have approved one of the foreign bids which is 38% below the lowest American bid, and the purchasing department of the Authority has recommended that the Board accept it.

At a hearing with the TVA Board, J. L. Singleton, Vice President of Allis-Chalmers, said emphatically that he was there to plead a cause and the principle concerning the increasing problem of heavy power equipment imports.

Mr. Singleton told the board of directors of TVA that: "The only reason our government can set tax rates so high is due to the high level economy which we have developed in this country. Your purchasing this large quantity of heavy electrical apparatus abroad is ignoring your responsibility to play fair by spending money our government collects in the same kind of an economy from which it gets it."

Mr. Singleton went on to explain that labor rates in American plants are from two to three times as high as those of the foreign bidders.

In response to press inquiries following the meeting with Allis-Chalmers officials, the TVA Board of Directors said: "Economy and efficiency are of primary importance in all of TVA's operations. Foreign bids are considered and purchases made when they would contribute to economical operation. Such purchases are in conformance with the national policy of the United States with respect to international trade."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Hazle Brook Premium Anthracite
GENCO ANTHRACITE & BITUMINOUS COALS
Irwin, Pa. New York Norfolk

NEW Catalogs & Bulletins

. . . there is always a BETTER WAY

MAINTENANCE—TOOLS EQUIPMENT & METHODS

1—Neoprene Rubber-Coating—Charcote, a waterproof protective barrier against rust and corrosion described in 4 p bulletin. Offers plant engineer outstanding protection against corrosive fumes, salt spray, abrasion and moisture. — CHARLESTON RUBBER CO.

5 — Metal Cutters — Bulletin 655 shows actual cost figures on various metal cutting jobs (bolt, rod, wire, chain, etc.), by using cutters, hand and power-operated cutters.— H. K. PORTER INC.

9—Rust Solvent — Data sheet describes "Liquid Wrench" a penetrating rust solvent that loosens rusted bolts, nuts, screws and "frozen" parts. Safe for all metals and alloys. — RADIATOR SPECIALTY CO.

11—Maintenance Ideas—"Genius at Work" — Contains ideas about plant maintenance, bits of philosophy, new products and a description of the company's line. — KANO LABORATORIES.

20—Lubrication Manual — Selection & application of right lubricant for 560 lubricated plug valve applications featured in 12 p manual. Service and temperature ranges tabulated. — WALWORTH COMPANY.

27—Wear-Free Packings — File No. DMSP describes complete line of metallic and semi-metallic packings. — DURAMETALLIC CORPORATION.

29—Belting Repairs — Two bulletins "How to Properly Join Belts" and "Belt Fastener Selection Chart" offer service help on conveyor, elevator and transmission belting. — CRESCENT BELT FASTENER CO.

30—Electric Stud Heaters—Bulletin L-1244 illustrates and describes how Electric Stud Heaters give faster and more accurate shrink-tightening of large studs and holding bolts. Contains procedure for use and table of heater sizes, ratings and prices. — EDWIN L. WIEGAND CO.

36—Packing Handbook — Bulletin AD-162 details a wide variety of packings, gaskets and seals and their materials of construction and uses. Contains detailed table listing effect of numerous gases, liquids and solvents on packing materials. — GARLOCK PACKING CO.

70—Multi-Purpose Grease — Bulletins describe new single product Gulfcrown grease (4 consistencies) that does the work of many—simplifies application and avoids errors, reduces inventory and cuts lubrication costs; grease gun or centralized system application. — GULF OIL CORPORATION.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

100—Power Plant Pumps—Bulletin BJP 58-8 covers complete line of standard pumps for all power plant requirements — from 12,000 hp, doublecase boiler feed pump, to condensate, circulating and booster pumping duty. Also, special pumps for nuclear power plant installation. —BYRON JACKSON PUMPS, INC.

102 — Teflon Gear Pump — Bulletin describes self-priming rotary gear pump suitable for non-lubricating and corrosive fluids. Suitable for speeds to 1750 rpm at capacities to 10 gpm & pressures to 100 psi. — ECO ENGINEERING CO.

107—Proportioning Pumps—4 p brochure illustrates and describes company's proportioning pumps and package chemical feeding units. Includes applications and specifications.—BIRD ARCHER CO.

122—Industrial Fans—Bulletin 702 covers Type XL fans for air and material handling. Volumes to 130,000 cfm, pressures to 18" SP. Catalog 855 describes Pressure Fans. Volumes to 12,000 cfm, 10" to 50" SP. — CLARAGE FAN CO.

123 — Slurry Pump — Catalog describes the new SP-90 slurry pump which permits proportion of slurries in the mix tank to remain constant, with pumping rates variable from maximum to 1/5 of maximum.—MANZEL.

132—Glassed Centrifugal Pumps — 12 page Bulletin 725.2 describes line of glassed pumps for handling corrosive acids and alkalies. Every part of pump exposed to liquid has a tough glass surface. Specifications, ratings, dimensions. — GOULDS PUMPS, INC.

135—Heat Exchanger — Bulletin 132 shows how sectional Aero unit gives close temperature control, saves labor, power, and water; design improves heat transfer to outdoor air by evaporation; 7,000,000 to 18,000,000 Btu/hr capacity range. —NIAGARA BLOWER COMPANY.

165 — After Cooler — Bulletin 130 shows how the Aero unit removes moisture from compressed air or gases; "cools water for jackets and intercoolers; cools air or gases in both power and process systems; and protects air tools and pneumatic systems from water damage.—NIAGARA BLOWER COMPANY.

169—Airfoil Fans — Bulletin covers complete line of Airfoil mechanical draft fans for forced and induced draft featuring wide range of pressure-volume ratios, high efficiency, low noise level, rugged construction. —GREEN FUEL ECONOMIZER CO.

189 — Air Traps — Bulletin 289 describes ball float traps for draining water from air, gas or steam lines, or for draining light liquids from gas under pressure. Physical and selection data, prices, etc. — ARMSTRONG MACHINE WORKS.

INSTRUMENTS—METERS CONTROLS—REGULATORS

201—Valves & Gages—Handy guide No. 36 gives data & prices on valves, liquid-level gages & accessories for process and power industries. — PENBERTHY MFG. CO.

204—Floatless Level Control — Data sheets PC-37 describe control that is unaffected by surface agita-

tion and equipment vibration. Simple, compact, one adjustment unit.—LESLIE CO.

209—Liquid Level Controls—Catalog describes controls for almost any liquid, at any pressure, at any temperature. Can be furnished in top-mounting, side-mounting styles, or as external float cage units. Almost unlimited application. — MAGNETROL, INC.

213—Meters & Controls — Bulletin G15-1 describes and illustrates systems and instruments used in the measuring, transmitting, receiving, interpreting and controlling of 18 variables normally encountered in power plant and industrial plant operation.—BAILEY METER COMPANY.

224—Feedwater Regulator—Bull[illegible]1044 describes the BI Feedwater Regulator, the single-element unit employing a thermostatic-tube level controller which actuates a regulating valve in feed line. For loads from 10 to 785 psig. Includes specifications table and schematic diagram. — COPES-VULCAN DIV.

228—Fuel Cut-Outs & Water Level Alarms — Brochure D2 — Electrode type equipment for installation of water columns to provide fuel cut-out, high and low water level alarms and pump cut on and off. For pressures to 2500 psi. — RELIANCE GAUGE COLUMN CO.

235—Liquid Levels — Bulletin 532 describes indicator which gives a reliable, automatic reading of storage tank contents. 20" dial in 3 x 10" case saves panel space. No outside power source needed; can be located up to 250 ft from tank. — THE LIQUIDOMETER CORP.

258—Temperature Regulators—Bulletin 5307A describes temperature regulators that vary the flow of steam or cooling water to heater or process to automatically maintain constant temperature. Includes sizing and capacity data.—LESLIE CO.

297—Remote Signal Alarms—Bulletin WG-1824 describes how lights on horns, operated by indicator control unit give instant warning of any serious deviation from normal boiler water level. — YARNALL-WARING COMPANY.

PLANT CONSTRUCTION—WELDING EQUIPMENT—SPECIALTIES

300—Fact Folders — 23 up-to-date industrial fact-file folders on aluminum, steel, copper, stainless steel, insulation, roofing and other industrial supplies immediately available from 9 Southern warehouses. — REYNOLDS ALUMINUM SUPPLY CO.

301—Vacuum Cleaning Systems — How portable and stationary systems cut costs and increase plant efficiency shown in Booklet P8 and AB-100. Eight heavy duty units (1½ to 15 hp) for cleaning hard to get at areas, reclaiming valuable materials, etc. — U. S. HOFFMAN MACH. CORP.

303—Stacks & Breechings — Form 75 describes monolithic linings for full protection of stacks and breechings, utilizing castable refractories. Typical installations illustrated and described. — PLIBRICO CO.

304—Backing Rings — Bulletin 56-2 describes rings designed for fast economical fit-up in piping, tubing, fittings and valves. Shows how rings assure uniform complete-penetration welds and ease of handling in both shop and field. Carbon steel, wrought iron, chrome alloys, stainless, aluminum and copper.—ROBVON BACKING RING COMPANY.

KEEP-UP-TO-DATE
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306—Steel Buildings — Shed roof, gable roof frameless and gable roof rigid frame units described in Catalog SX-13757. 5,000 sizes available to meet all space needs. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

310—Incinerator — Metal cased, insulated, refractory lined incinerators for industrial and commercial use. City smoke code approved. Fast, economical installation — any size and capacity. — NORTH STATE PYROPHYLLITE CO.

315—Pressure Vessels — Catalog 100 discusses your plate fabrication problems and shows how company custom-fabricates hot water storage heaters, tanks, air receivers, blow-off tanks, etc. Corrosion resistant linings and materials featured. Suggested specifications and other valuable technical data given. — J. J. FINNIGAN CO.

316 — Drainage & Construction — Catalog Gen-10658 includes data on drainage and construction products for industrial uses. Includes corrugated metal pipe, paved-invert pipe, Asbestos-Bonded pipe, Multi-Plate pipe, pipe-arches, perforated pipe, water control gates, etc. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

319—Portable Band Saw — Bulletin describes the Kalamobile, a portable metal-cutting band saw. Has rubber-tired 12" wheels and telescoping handles. Capacity 6" rounds - 10" flat. — Machine Tool Div., KALAMAZOO TANK AND SILO CO.

324—Painting New Plants — "Plan Painting of New Plants to Reduce Costs" describes how company's lead-suboxide paints can save 1 or 2 coats of paint on new plants. Eventual repainting costs are cut as well, since these paints form a dense, metallic lead film which can be recoated without expensive scraping, sanding or repriming. — SUBOX INC.

333—High Alloy Castings—General selection guide Bulletin 3354G covers chrome-iron and chrome-nickel castings which resist corrosion, high temperature and abrasion. — DURALOY COMPANY.

338—4-D Wrought Iron — 8 p booklet discusses 4-D Wrought Iron which is 25% more corrosive resistant than standard wrought iron. Illustrated test section, applications and service conditions included. — A. M. BYERS CO.

348—Building Drainage — 64 p bulletin describes the advantages of 4-D wrought iron for soil, waste, vent and downspout piping. Includes sections on corrosive conditions, comparative service, costs, Durham systems, and photographic surveys on vent corrosion. — A. M. BYERS.

350—Industrial Space Heaters—Bulletin GC 4-55 describes complete line of oil or gas fired Thermobloc industrial heaters for any size job. Completely self-contained, fully automatic. — THERMOBLOC DIV., PRAT-DANIEL CORP.

353—Storage Batteries — 24 p Bulletin 210 reports on engineering studies of the effect of temperature on battery capacity. Provides tabulated data and general information necessary for selection of batteries and charging equipment, proper battery and charger maintenance, selection of battery racks and determination of battery discharge ratings.—EXIDE INDUSTRIAL DIVISION.

PIPING—VALVES—FITTINGS STEAM SPECIALTIES—TRAPS

401—Steam Traps — Bulletin 775 gives price, dimension and capacity data on Open Float and Thermostatic Steam Traps for trouble-free heating service.—ARMSTRONG MACHINE WORKS.

402—Forged Steel Valves—General Purpose Valves, Supplement No. 1 to Catalog F-9, covers gate, globe

Bulletins (Cont.)

and angle valves. ½" thru 2" sizes, for 150-800 pound service. Featuring 13% chrome stainless steel trim with hard facings. — HENRY VOGT MACHINE CO.

403—Valve Operators—Folder shows how re-designed sprocket rim makes any valve readily accessible from the floor. Simplifies pipe layouts, prevents accidents, fits all valve wheels. — BABBITT STEAM SPECIALTY CO.

406—Blow-Off Valves — Catalog B-434 describes the valve to use for boilers to 2500 psi. Disc has welded-in stellite facing and inlet nozzle has integral welded-in heavy stellite seat. — YARNALL-WARING COMPANY.

407—Piping Materials—Bulletin reports on intensive investigation into problem of main steam piping materials and gives data on stress rupture characteristics of Types 316 and 347 stainless steel piping adjacent to welded joints. — PITTSBURGH PIPING AND EQUIPMENT COMPANY.

417—Welding Fittings — 192 page Cat. 54 gives design data on piping and piping application including digests of specifications, working pressures, design formulas, etc. Covers welding fittings, prefabricated pipe, forged steel flanges, and pipe coils. — MIDWEST PIPING COMPANY, INC.

419—Small Gate Valve — Multiple applications of small forged steel gate valve noted in Catalog 10. Low maintenance. Sizes from ¼" to 2"; rising stem with yoke or rising stem with inside screw; Pressures from 380 psi at 1000 F to 2000 psi at 100 F. — THE CHAPMAN VALVE MFG. COMPANY.

425 — Steam Trap with only three parts — cap, disc and body described in Bulletin 257. No valve closing mechanisms. Only moving part is solid stainless steel disc. Same trap for all loads and pressure 10-600 psi. — SARCO COMPANY, INC.

442—Sewer Pipe — Folder SF-14056 describes how Smooth-Flo Sewer pipe provides top flow capacity and strength of corrugated metal. Flexible design, strong joints, and centrifugally-spun asphalt lining. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

443—PVC Fittings & Flanges—Corrosion resistant polyvinyl chloride pipe fittings & flanges covered in 12 p catalog, featuring characteristics, advantages, limitations, operating pressures, temperatures, field tests, etc.—GRINNELL COMPANY, INC.

471—Pipe — Catalog 575C lists specifications for all sizes of pipe from ⅛ in. to 24 in. in diameter. Tables give data and description, wall thickness and weight. Also describes company's pipe fabrication facilities for structural uses.—L. B. FOSTER CO.

479—Multiport Drainers — Publication 5201 containing 8 pages describes units for removing large quantities of condensate under vacuum or pressures, as from evaporators, heaters, separators, coils, or steam lines (up to 200 psi maximum). Lists discharge capacities, shows features and typical installations. — COCHRANE CORPORATION.

BOILERS—STOKERS TURBINES—BURNERS

501—Package Boiler—New compact, low cost package unit (oil or gas fired) for small space requirements is described in Bulletin DK-1. Pressures to 325 psi, steam capacities to 45,000 lb/hr.—E. KEELER CO.

504—Steam Generators — Bulletin AXY - 1 describes auxiliary equipment and design features of the Amesteam Generator for sizes 10 through 600 hp and illustrates how this integrated design reduces cost and increases life and reliability.—AMES IRON WORKS, INC.

USE SPI READER SERVICE

See Pages 65-66

505—Refractories — Paco High Heat Duty and Super Duty Plastic Refractories. Fire brick, high temperature cement, castables. Installation and engineering service. Free estimates and inspection. — NORTH STATE PYROPHYLLITE CO.

506—Package Boilers — Practical construction with Continental two pass design described in Bulletin BE100. Units range in size from 20 to 600 hp; 15 to 250 pressures burning oil, gas or combination. — BOILER ENGINEERING & SUPPLY.

509—Free Coal Counseling — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose.—NORFOLK AND WESTERN RAILWAY.

513—Power Plant Equipment — 12 page booklet No. 1022-B gives details on combustion and boiler feedwater control, pressure reducing, desuperheating and automatic soot blowing — retractable and rotary. — COPES - VULCAN DIVISION, BLAW-KNOX COMPANY.

516—Small Boiler Performance — 4 p Bulletin shows how the packaged Ljungstrom air preheater boosts performance. Boilers as small as 25,000 lb/hr can have advantages of regenerative preheating—saves fuel, boosts output, and permits use of lower grade fuels.—THE AIR PREHEATER CORPORATION.

523—Soot Blowers—Bulletin 1030 describes Vulcan T-30 retractable soot blowers, available in lengths up to 38 ft. Includes sectional drawings and special design features. — COPES-VULCAN DIVISION.

527—Pneumatic Spreader Stoker — Bulletin shows how unit combines coal drying, metering, conveying, uniform burning and cinder return in one efficient system. — IRON FIREMAN MFG. CO.

530—Coal Plant Specifications — 64 page brochure, including 5 drawings, is a comprehensive guide for preparing specifications on coal-fired low-pressure heating plants in the size range of 750,000 to 5,500,000 Btu/hr. All aspects affected by choice of fuels from storage bin to stack design covered fully. — BITUMINOUS COAL INSTITUTE.

549—Firing Systems — Folder No. 5843 describes industrial packaged forced-draft firing systems for dual-fuel or single-fuel firing of high or low pressure natural, LP or manufactured gas or any grade of oil from No. 2 thru No. 6 in Scotch marine, steel firebox, water tube or cast iron boilers. Illustrated.—IRON FIREMAN MFG. CO.

561—Ash Removal—Bulletins S-57 & S-57A shows how costs can be reduced with pneumatic and hydraulic ash conveyors. High operating efficiency based on tons of ash handled per pound of steam used. — NATIONAL CONVEYORS CO., INC.

588—Industrial Burners — General Bulletin 757, 16 pages — Describes and illustrates industrial oil burners, gas burners, combination gas and oil burners for boilers, dryers, stills, retorts, kilns, etc., and fuel oil pumping and heating units which go therewith. — NATIONAL AIROIL BURNER CO.

593—Packaged Generators — 6 p folder "More Performance From Less Investment" describes line of package steam generators with range of 15 hp to 650 hp. Includes specification sheets on package hot water generators with a range of 670 mbh to 6700 mbh. — CYCLOTHERM DIVISION.

ENGINES—DRIVES POWER TRANSMISSION MATERIALS HANDLING

600 — Conveyor Idlers — Bulletin SI-116 describes pre-lubricated "UST" Conveyor Idlers. Incorporating Timken bearings and Garlock Klozures, construction permits operating without lubrication for 1-3 years or more. — CONTINENTAL GIN COMPANY.

601—Crane Runway Rails — Catalog gives information on crane rails, angle bars, crane stops, rail clips, hook and anchor bolts, bearing plates. Also specifications on various sizes of crane rail clips and explains how to order rails. — L. B. FOSTER CO.

604 — Motor Units — Catalog 51 describes motor units for accurate performance and longer, lower cost life for operation of valves, floor-stands and sluice gates. — CHAPMAN VALVE MANUFACTURING CO.

607—Crane Systems — Booklet 2008, profusely illustrated, shows how Tramrail transfer cranes can systematize handling; engineering and application data. — CLEVELAND TRAMRAIL DIV.

609—Automatic Control of Materials by Weight — 6 p Bulletin 0557 discusses how the Select-O-Weigh System provides complete automation in continuous or batch processing operations, including record keeping. — RICHARDSON SCALE CO.

614—Vertical Transportation — Elevator Catalog — Describes and illustrates details of passenger and freight elevators, escalators, dumbwaiters, and modernization and maintenance equipment for use in industrial, utility and service plants. — OTIS ELEVATOR CO.

629 — Longer V-Belt Life — 12 page Bulletin 20x6234C describes various types of V-belts and tells how to select and match them. Lists seven steps for correct installation and hints for making them last longer. — ALLIS - CHALMERS MFG. Co.

661—D-C Crane Control — 8 p Bulletin GEA-6434 features precision hoist, bridge and trolley control systems. — GENERAL ELECTRIC CO.

WATER TREATMENT—HEATING & AIR CONDITIONING—DUST & FUME CONTROL—REFRIGERATION

701—Exhausting Corrosive Fumes—Bulletin 702-A shows how corrosive fumes can be exhausted with rubber, lead lined or specially coated fans. — CLARAGE FAN CO.

703 — Air Conditioning — Bulletin 122 describes and illustrates operation and suggests applications for air conditioning method that controls humidity to 1% rh and temperature to 1 F (up to 140 F) with accuracy, independent of moisture sensitive instruments. — NIAGARA BLOWER CO.

708—Zeolite Softener — 8 p Bulletin 4530-A discusses the hydrogen zeolite process — its advantages, chemistry and neutralizing variations. — COCHRANE CORP.

710—Scale Remover—Bulletin shows how Anco Scale Remover quickly eliminates scale in boilers, water lines, refrigeration and air conditioning systems.—ANDERSON CHEMICAL COMPANY.

713—Electric Precipitators—26 page Bulletin 104 shows how units meet five engineering requirements —Positive control of gas flow; high, uniform electrode emission; Effective continuous cycle rapping; and Safe, trouble-free high voltage equipment. Gives 9 time-tested steps to a successful installation.—BUELL ENGINEERING COMPANY.

716 — Dust Collection — Whether nuisance elimination or process material recovery, check on Whirlex Dust Collector Units. Engineering data available. — THE FLY ASH ARRESTOR CORP.

722—Packaged De-Ionizers — Bulletin PK describes complete line of de-ionizers, which produce chemically pure water at flow rates up to 1000 gph. Standardized units, shipped from factory fully-assembled, eliminating complicated installation problems, and virtually eliminating service problems. Recommended for laboratory and plant production uses. — ILLINOIS WATER TREATMENT COMPANY.

739—Air Engineering — 8 p Bulletin 135 illustrates and describes air engineering apparatus for process industries. Includes after-coolers, air conditioners, liquid coolers, heat exchangers, condensers, refrigeration

VERSATILE, NEW PLUG-IN STEAM GENERATOR

Series "R" SPEEDYLECTRIC generates steam to 250 psig. and temperatures to 405°F. Write today for Bulletin SG-200. Larger capacity Steam-Jet Cleaners available. Write for Bulletin JC-100.

Easily Converted to a Steam-Jet Cleaner!

For plug-in operation on 110- and 220-volt circuits, the precision-built, compact, ASME Code Series "R" SPEEDYLECTRIC steam generator is ideal for laboratory, pilot plant and even production processes requiring small volumes of high-pressure steam!

This midget-size SPEEDYLECTRIC, like all SPEEDYLECTRIC models, features safe, simple, electrode heating with precise current control. Easily converted to a Steam-Jet Cleaner for sterilizing and de-icing, by means of an accessory kit.

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(11) Power Generating Equipment
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Bulletins (Cont.)

equipment. — NIAGARA BLOWER CO.

748—Stop Fungal Decay — Bulletin MT-58 describes company's preservative wood treatment for cooling towers, pinpoints organisms that destroy effective performance and prescribes treatment that arrests these destructive organisms, as well as the application techniques. — THE MARLEY COMPANY.

794—Refrigeration Compressors — Bulletin 112-J describes the applications and specifications of heavy-duty compressors for all types of refrigeration service. Pictures many typical installations and uses. — FRICK CO.

ELECTRICAL

801—Motors—Bulletin describes and catalogs more popular a-c motors from 1 to 600 hp, for every process and manufacturing requirement. Single phase and polyphase; surpass NEMA specifications. — BROOK MOTOR COMPANY.

802—Small Relays—Simple solenoid design with only one moving part described in Bulletin 700. Silver alloy contacts need no cleaning, filing, or other maintenance. — ALLEN-BRADLEY CO.

819—Plug-In Power Distribution — 24 p Book GEA-6173 describes 225-1000 amp plug-in Flex-A-Power busway with aluminum conductors. Lists features, applications, ratings, construction and installation information and specifications. — GENERAL ELECTRIC CO.

842 — Circuit Protection — Bulletin FIS describes the maintenance free Fusetron fuses which protect motors, solenoids, coils and transformers against burnout, and which increase production by eliminating needless blows.—BUSSMANN MFG. CO.

874—High-Voltage Cable — Bulletin EB-27 gives full details on performance of Type AB insulation in 15 Industry Specification Tests, including operating temperature. — ANACONDA WIRE & CABLE COMPANY.

899—D-C Insulation Testing — Bulletin GEA-6722 describes the 3 step test of insulation system. Includes thumbnail outline of "What You Should Know About D-C Insulation Testing of Motors, Generators, and Power Transmission Cables." — GENERAL ELECTRIC CO.

FUTURE EVENTS
of Engineering Interest

Jan. 26-29: 14th International Heating & Air-Conditioning Exposition, American Society of Heating & Air-Conditioning Engineers, Convention Hall, Philadelphia, Pa. In conjunction with 65th Annual Meeting of the Society. E. K. Stevens, Pres., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Jan. 26-29: 10th Plant Maintenance & Engineering Conference and Show, Public Auditorium, Cleveland, Ohio. Clapp & Poliak, Inc., 341 Madison Ave., New York 17.

Mar. 1-3: Southern Safety Conference & Exposition, Battery Park and George Vanderbilt Hotels, Asheville, N. C. W. L. Groth, Exec. Dir., Southern Safety Conference, Box 8927, Richmond 25, Va.

Mar. 8-11: Gas Turbine Meeting, American Society of Mechanical Engineers, Cincinnati, Ohio. L. S. Dennegar, Dir. of Pub. Rel., ASME, 29 West 39th St., New York 18, N. Y.

Mar. 18-20: 22nd Annual Short Course for Superintendents & Operators of Water & Sewerage Systems. Louisiana State University, Baton Rouge, La. F. H. Fenn, Dean, College of Engrg. and Dir., Engrg. Experiment Sta., La. State Univ., Baton Rouge 3, La.

Mar. 31-Apr. 2: 21st American Power Conference, Hotel Sherman, Chicago, Ill. R. A. Budenholzer, Mech. Engrg. Dept., Illinois Institute of Technology, 3300 Federal St., Chicago 16, Ill.

June 1-5: 5th World Petroleum Congress Exposition. Coliseum, New York, N. Y. E. K. Stevens, Exposition Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

June 9-11: Material Handling Institute's Exposition. Public Auditorium, Cleveland, Ohio. W. L. Redding, Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22, Pa.

This DIXISTEEL® Building

COST ONLY $3.32 A SQUARE FOOT

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$1.46 a sq. ft. for this 25,200 sq. ft. warehouse, including all accessories

$4.00 a sq. ft. for this 6,000 sq. ft. warehouse and air-conditioned office.

$2.00 a sq. ft. for this 10,000 sq. ft. hanger, including expensive hanger doors at each end

This 7,000 sq. ft. warehouse and 450 sq. ft. office of the Benton Bros. Drayage & Storage Co., Brunswick, Georgia, was completed in 40 days at a total cost of only $3.32 a square foot. This included a reinforced concrete floor 42" above ground level; two 10' x 20' canopies; three overhead doors; all heating, wiring and plumbing, including three toilets and shower; insulated, air-conditioned office with brick side-walls; painting.

The Benton building is typical of the hundreds of DIXISTEEL Buildings erected throughout the South—some for as little as $1.25 a square foot.

There is a DIXISTEEL Building to suit your needs—from the smallest, to large, clear-span multiple units covering any area desired.

Contact your nearest DIXISTEEL Building dealer or write for descriptive literature and details.

- Eight standard widths—30' 40' 50' 60' 70' 80' 90' 100'
- Lengths can be any multiple of standard 20' unit
- Sidewall heights 10' 12' 14' 20'
- Multiple units of virtually any width, height, length

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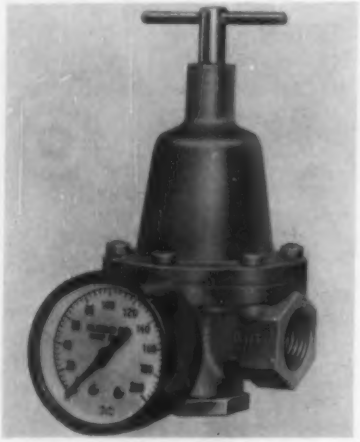
NEW Product Briefs

. . . there is always a BETTER WAY

Air Regulator

A-1 The newly designed "Diatrol" compressed air regulator by **Wilkerson Corp.**, 1667 West Girard Ave., Englewood, Colorado, is a very compact and inexpensive unit, which delivers accurate air control to any air-operated tool or equipment without chattering.



The unit will deliver a steady, even flow of air and has a built-in automatic bleed device for quickly relieving excessive pressures when change of tools or air regulation is required. To eliminate unauthorized changing of the setting, these regulators are available with a tamper-proof adjustment screw without additional cost.

The "Diatrol" is equipped with two gauge holes for ease of right or left hand air flow directions, thereby eliminating unnecessary expensive fittings for frontal facing of the pressure gauge. It will take a standard ¼" back mounted gauge, which is sturdier and less expensive than the off-standard ⅛" gauge used on other regulators.

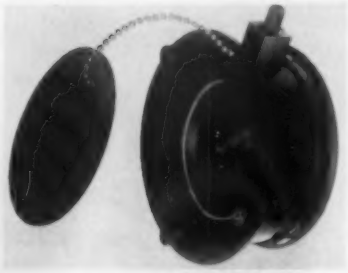
Pipe connections are straight through and are ¼", ⅜" and ½" NPT. The unit will afford regulated operating pressures of from 10 to 125 psi and will operate at high or low cfm with minimum pressure drop.

Packings & Seals for Severe Applications

A-2 Viton, a new versatile broad temperature range polymer developed by DuPont, is now being used to manufacture packings, seals and gaskets by **The Garlock Packing Company**, Palmyra, New York.

Garlock's Viton formulations (durometer hardness ranging from 60 to 90) are for application where maximum resistance to deterioration by heat, oils, solvents and other corrosive liquids is essential.

Viton is unequalled for service against oils and solvents at temperatures over 400 F and is highly resistant to ozone and weather deterioration. The new product also has good resistance to benzene, carbon tetrachloride, carbon disulfide, naptha, turpentine, aniline, trichlorethylene, acetone and other solvents.



Solid Front Gages

A-3 A newly designed line of gages for positive protection of personnel in the event of tube failure has been announced by **Crosby Valve & Gage Company**, 43 Kendrick St., Wrentham, Mass.

The Crosby Solid Front Gages cannot blow out toward the front as a shield is cast as an integral part of the rigid case construction. A full nylon back blows out at case pressures less than 2 psi should tube leak or fail.

Hot Liquid Sample Cooler

A-4 A constant analysis of boiler water or other heated liquid characteristics is provided by this compact sample cooler designed by the **Bird-Archer Company**, 4337 No. American St., Philadelphia 40, Pa.

Overall height of the cooler is 7⅝" and outside diameter measures 4½". The body and cap are made of ¼" cast bronze and house a 12 foot cooling coil of ¼" copper tubing through which the hot sample flows. Sample inlet and outlet are each ⅜" diameter. The coolant is introduced through a ½" inlet, passes over the copper tubing and leaves via a ½" outlet. Price, $55.00.

Centrifugal Extractor

A-5 A new centrifugal moisture extractor has been developed by **The Johnson-March Corp.**, Philadelphia 3, Pa., that removes free moisture from wet scrubber exhausts. Five sizes are available to handle a range of exhaust gases from 10 to 35 thousand cfm.

The new extractor changes the direction of exhaust gas flow from a vertical to a cyclonic path. Centrifugal action imparted by stationary impeller blades removes all free moisture along with some of the entrained dust or solid particles. Moisture impinges on the inside of the outer shell and collects at a drain outlet for disposal.

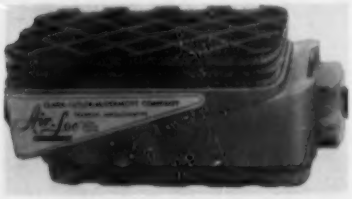
Cleaning and inspection is facilitated by two, water-tight, neoprene gasketed inspection doors and a backwash nozzle at the apex of the stack. The operator controlled spray both cleans the vanes and flushes the stack. The nozzles consume 45 gpm at 60 psi pressure during cleaning operations.

Flexibility keeps installation costs to a minimum. The Johnson-March separator can be installed on the existing stack of any wet gas scrubber. The manufacturer recommends that approximately 6 ft of the existing stack be utilized as longer sections may make the unit difficult to install and to maintain. The stack can be extended 10 ft above the moisture extractor if a greater total stack height is necessary.

For More Free Data FILL IN CODE NO. on the Handy Return Card — Page 65

Machinery Mount

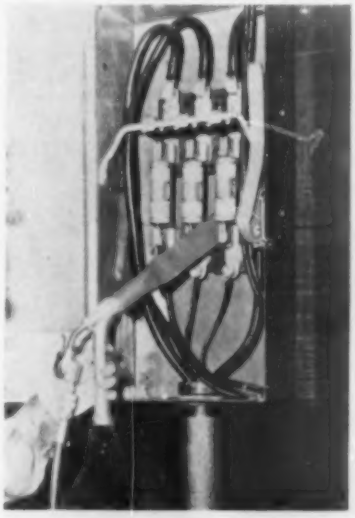
A-6 "Wedgmount" — a new type of machinery mount which absorbs vibration and permits instant precision leveling, has been developed by **Clark-Cutler-McDermott Company**, Franklin, Mass.



Top and bottom surfaces of the mount are patented "Air-Loc" vibration absorption pads. Body of the mount consists of two compensating metal wedges which provides a raising or lowering action when a nut is turned on a bolt running through the center of the mount.

Cleaning With No Power Shut-Down

A-7 Cleaning electrical switchboards, control panels, boxes, etc., without the usual power shut-down is just one of the many applications of the Little Windy Airvac — a powerful, air-operated vacuum cleaner manufactured by **M-M-A, Inc.**, Lancaster,

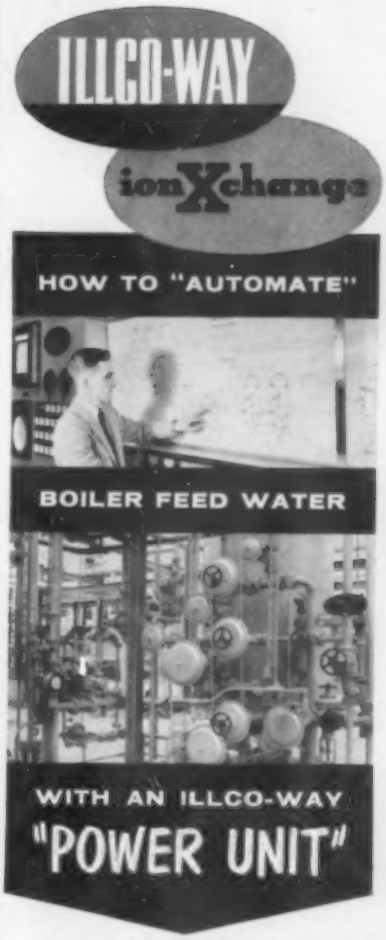


Pa., that operates on the Venturi principle and fits any standard air hose.

A wide selection of non-conductive, fibre and plastic attachments fit this unusual device to such applications and saves countless hours in any plant.

The Little Windy is usable for many other wet and dry pick-up operations. A wide selection of taper-fit accessories increase its versatility and make it ideal and safe for cleaning benches, machinery, walls, shelving, beams, etc. A handy quickly-adjustable clamp makes the changeover to a hose for liquid pick-up or transference, a matter of moments.

Unit can be used in hazardous areas and with many combustible materials. With its non-ferrous castings, there is no striking spark. The absence of any moving parts or electrical connections make it even safer.



These pictures show an *Automatic* Mixed-Bed De-Ionizer designed for an outdoor installation at a power plant in Louisiana. The high-pressure boilers require feed water of uniform maximum purity — which this ILLCO-WAY "Power Unit" supplies *without attention* other than periodic checks of recording instruments. ILLCO-WAY "Power Units" are shipped *completely assembled*, ready for installation and hook-up.

REMOVES SILICA AND CO_2

The Mixed-Bed IonXchanger, as designed and manufactured by Illinois Water Treatment Company, is often the most economical and most reliable means for treating *any kind* of supply water to obtain the maximum purity required by modern power plants. *See your ILLCO-WAY representative for details on specific applications.*

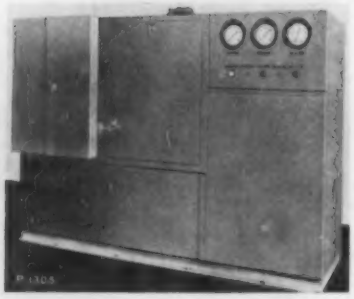
U.S. PATENTS: 2,771,424 2,605,084

ILLCO-WAY

ILLINOIS WATER TREATMENT CO.
840 Cedar St.
Rockford, Ill.

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

New Product Briefs (Continued)



Packaged Firing Units

A-8 **National Airoil Burner Company, Inc.,** 1279 E. Sedgley Ave., Philadelphia 34, Pa. has announced their New Series 20 Steam Atomizing Packaged Firing Units for oil and/or gas fuels.

These units are fully automatic and offer low fire start, electric-gas ignition, modulation fire control, damper sequence control, forced draft combustion air, electronic combustion safety supervision, mechanical atomizing — steam assisted internal mixing oil burner, ring or cylindrical type gas burner for gas fuel, fire tested before shipment. Bulletin 28 gives details.

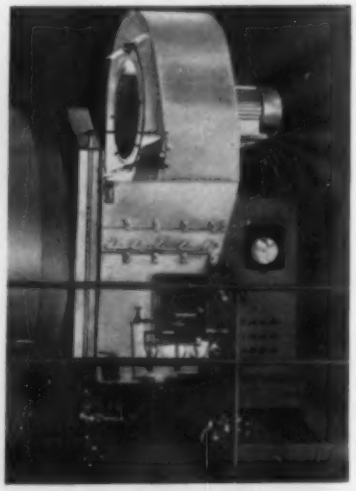
Ventilator-Skylight

A-9 **The Swartwout Company,** 18511 Euclid Ave., Cleveland 12, Ohio, has developed a high capacity gravity roof ventilator that doubles as a skylight. The "Lite-'n-Aire" has translucent fiberglass dampers and gutters that provide natural light without the additional cost of separate skylights.

Fiberglass dampers and gutters are strong, non-warping and resistant to damage from fumes and chemicals. Whether translucent dampers are open or closed, the light transmitted by Lite-'n-Aire is well diffused and does not have isolated hot spots with accompanying glare often produced by conventional skylights or plastic bubbles.

Each 7'6" x 10' Lite-'n-Aire unit has 30 sq ft of free air opening. Yet, overall height is only 21½". Design of this ventilator moves large volumes of air quietly, efficiently and economically. As a safety feature, an Underwriters approved fusible link mechanism parts when temperatures exceed 212 F, automatically opening dampers to vent fire, smoke and gases out of the building. Folder CAM-3 gives details.

For More Free Data FILL IN CODE NO. on the Handy Return Card — Page 65



Industrial Burner

A-10 A complete line of "Fyr-Compak," W-B-F single burner units is now offered by the **Coen Company,** 40 Broadman Pl., San Francisco 3, Calif. W-B-F stands for a package unit of windbox, burner and fan, in closely coupled design.

These units burn gas, oil or a combination of both fuels and are specifically engineered to provide optimum control of combustion air requirements for single burner firing of boilers, air heaters, driers, kilns and other industrial furnaces. Five compact models provide different ranges of heat releases from 3,000,000 to 90,000,00 Btu hr.

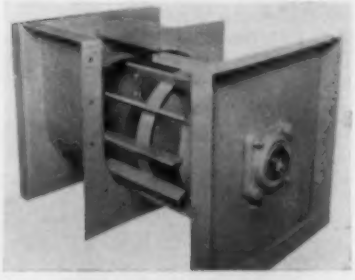
Electric Hoists

A-11 Three new models of the CM Lodestar electric hoist have been added to the stock of **Chisholm-Moore Hoist Div.,** Tonawanda, N. Y. They extend the capacity range to 2 tons and double the lifting speeds available in the ½ and 1 ton sizes. Model R has a capacity of 2 tons and lifting speed of 8 fpm; the Model L, 1 ton capacity at 16 fpm; and Model J, ½ ton capacity at 32 fpm.

This now provides a greater selection of lifting speeds and of capacities ranging from ⅛ to 2 tons.

Rotary Paddle Feeder

A-12 Formulation inaccuracies resulting from pulsating material delivery are eliminated by a newly-designed rotary paddle feeder which delivers a constant, uniform stream. **Richardson Scale Co.,** Van Houten Ave., Clifton, N. J., is the manufacturer.



Operating principle of the new feeder is based on a series of paddles which revolve around a stable drum within a housing. This design

prevents "pile-up" of material and provides a unique self-cleaning feature. Uninterrupted material flow is further assured by a regulating baffle at the discharge point.

Since material is delivered practically "straight-in-line" vertically, installation of equipment directly below bin opening is permitted, with no loss of floor space. The feeder was designed originally to handle pelletized carbon black, but applications for the new unit are also seen for delivering mash, meals, urea, various salts and other small granular material, a company spokesman said. Capacities handled are up to 30 cfm.

The sealed ball bearings are placed "above" the stream of material for protection from leakage. A ¾ hp gearhead motor with chain drive is normally used, but for special applications variable speed drive is available.

Packaged Boilers up to 100,000 lb/hr

A-13 Natural circulation packaged boilers capable of generating up to 100,000 pounds or more per hour are available from the **The Babcock & Wilcox Co.**, 161 E. 42nd St., New York, N. Y.

Known as "B&W Package Boilers, Series 100-OG," they are expected to cost purchasers a total of approximately 20% less than units of similar capacities which must be erected in the field.

Considerable reduction in the total cost of the Series 100-OG boilers is made possible through the utilization of time-proven, reliable natural circulation. With this method, no recirculating pumps are required, simplifying operating and maintenance problems. Over - all maintenance costs also are minimized because practically the entire furnace and boiler envelope is water cooled. In addition, initial refractory costs as well as recurring maintenance costs are minimized since the lowest possible amount of refractory material is required.

The new boilers are designed to operate at steam pressures ranging from 250 to 775 psi. They burn either oil or gas or a combination of the two fuels. If a dual-fuel burner is installed with the unit, the stand-by fuel becomes instantly available, since one fuel can be lighted from the other.

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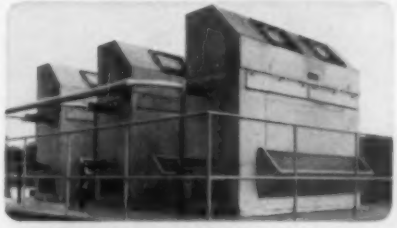
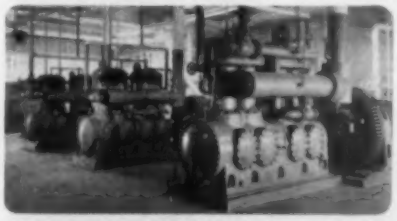
- COMPLETELY ENGINEERED SYSTEMS, DELIVERED AND INSTALLED



Frick Evaporative Condensers Save Up To 95% Of The Water Used.



Frick Heavy-Duty Four Cylinder Compressors Can Be Adapted to Handle Any Type of Refrigerant.

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DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA., U. S. A.

New Product Briefs (Continued)

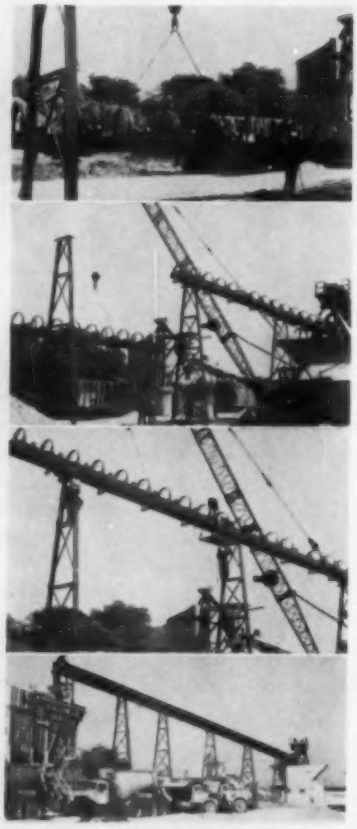
Belt Conveyor Easily Assembled

A-14 Sectional belt conveyor design by **Stephens-Adamson Mfg. Co.**, Ridgeway Ave., Aurora, Ill., offers ease and simplicity of erection. The four photos of a recent 170 ft conveyor installation emphasize the simple erection procedure of the pre-engineered sectional belt conveyor.

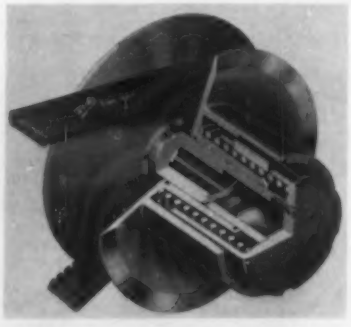
Fast installation was provided through the design which requires but eight bolts to securely join each of the 12 ft intermediate sections. Further savings were realized through a set-up procedure in which three of the 12 ft sections complete with carriers, return rollers, hinged hood and walkway supports were assembled on the ground, and then hoisted into place by crane and joined to the conveyor's supporting "A" frames. Complete conveyor head and tail sections with drive motor, Saco speed reducer, S-A curve crown pulleys, Sealmaster bearings and belt cleaner were installed with the same set-up simplicity.

The 170 ft sectional belt conveyor will feed sand and gravel to a concrete batch plant.

The unit will handle approximately 345 tons per hour. The material is carried at a rate of 350 fpm over a 24 in. wide belt. The unit is powered by a 15 hp motor. S-A bent-plate, an exclusive feature provides its own protection for the return belt run.



Ask for Bulletin 458 which offers an economical solution to thousands of belt conveyor applications.



Variable-Speed Sheave

A-15 MS series variable-speed pulleys, manufactured by **T. B. Wood's Sons Co.**, Chambersburg, Pa., incorporate a design that eliminates fretting corrosion as well as freezing and sticking. Bearing surfaces are re-oiled from an oil reservoir with each rotation of the pulley. The continuous rotational pumping action of the flange hub on the sleeve constantly renews and evenly distributes the oil film on the bearing surfaces.

There are no keys to obstruct the flow of oil around the surfaces between the flange hub and sleeve. A series of nylon-faced rubber keys, located outside the bearing surfaces, transmit the power from the stationary to the moving flange through a removable sleeve cap. The torsionally resilient keys not only carry the belt torque but assure even distribution of the load and equal transmission of power by both flanges.

The use of oil as the lubricant eliminates the possibility of sticking, which might result from grease drying and leaving a solid residuum. Under conditions of normal operation, the oil reservoir requires checking only twice a year. O-ring oil seals retain the lubricant for long periods between refills.

The new series consists of five pulleys: MS-77-2, MS-97-3, MS-97-5, MS-127-10 and MS-127-15. These are rated respectively 2, 3, 5, 10 and 15 hp. The horsepower ratings are based at constant torque and for maximum speeds, that is at maximum pitch diameter. At other pitch diameters, horsepower capacities reduce in proportion to the driven speed.

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Uniform Tube Rolling

A-16 Addition of two new air-driven heavy duty models to its Torq-Air-Matic line of automatic tube expander drives has been announced by **Thomas C. Wilson, Inc.**, 21-11 44th Ave., Long Island City, N. Y.

With the addition of these new models, one designed for heat exchangers up to 1½" od tubes, and the other for boiler tubes up to 3" od, the Torq-Air-Matic line now provides a complete range of equipment for uniform tube rolling.

New Model B is available in three versions, ranging from 38 to 22 ft lbs torque and from 450 to 750 rpm. It is designed for heat exchangers used in oil refineries, chemical plants, and other processing operations and may be with ferrous or nonferrous tubes ranging up to 1½" od.

Model C, which is available in one size, 75 ft lbs torque and 200 rpm, is designed for tubes used in package or power plant boilers, re-boiler or waste heat boilers, ammonia condensers, sulphite evaporators, air-preheaters, etc. It will roll up to 3" in ⅝" sheet.

The original Torq-Air-Matic drive, Model A, is designed for condensers, evaporators, and coolers in the marine, power, and air conditioning fields where light tube gauges and thin or moderately thick tube sheets are involved.

All Torq-Air-Matic drives measure torque output directly at the mandrel by means of a unique mechanical device, without relying on frictional, ratcheting, magnetic, hydraulic, or electrical devices.

High-Bay Lighting

A-17 Type MDS lighting fixtures are designed by **Crouse-Hinds Co.**, Syracuse 1, N. Y. for interior lighting of buildings having high ceilings. They are light in weight, highly efficient, and easy to assemble and wire.

These high-bay units are available for 300-1500 watt incandescent or 400-watt mercury lamps. Fixtures may be ordered with separable or single piece head, and with wide angle reflector suitable for low and medium mounting heights, or with concentrating reflector for high mounting and narrow areas.

Detecting Hazardous Vapors On-the-Spot

A-18 A pocket size tester for the detection of hazardous vapors is available from **Davis Emergency Equipment Company**, 55 Halleck St., Newark 4, New Jersey.

The Bantam Vapotester measures just 4" x 6" x 5" and weighs only 3¾ lb. Features include: One knob turns unit ON, and zeros meter; pilot light indicates ON and also illuminates dial; easily read dial features a 2½" scale; sample hose and aspirator bulb snap instantly into either side of the instrument for left or right hand use.

Compact leather case holds aspirator bulb, 5 ft sampling hose with short probe, spare battery and a screw driver. Tester is not affected by vapors of gasoline containing tetraethyl lead. Bulletin No. 1159 gives details.

Welding Cable Reel

A-19 A new economical self retracting reel for welding cable has been introduced by **United Specialties Inc.**, El Dorado, Arkansas, manufacturers of industrial hose and cable reels. Designed to hold 50 ft of 2/0 cable, it has current capacity of 300 amperes with 60% overload factor.

The Weldreel Model EA2 is equipped with a heavy duty retracting spring. To rewind cable it is necessary only to release locking pawls by means of a slight tug on the cable and permit the spring to do the rest. Cable pays out easily to the required length and is held by the locking pawls until released.

The unit is easily mounted on walls, floor, ceiling, or mobile equipment.

While use of the reel greatly extends cable life, cable may be changed easily when necessary. The entire mechanism is insulated from end support brackets. Reel shaft is hollow and non-magnetic.

BROOK TOTALLY ENCLOSED, FAN COOLED, MOTOR DRIVES INCINERATOR DRAFT FAN.

An ideal application for this 30 HP Brook Totally Enclosed, Fan Cooled, Slip Ring Motor—built to resist heat or cold, dust, fumes, moisture. It is driving an induced draft fan handling washed flue gas and raw air at 350°F. in an American Incinerator Corp. system processing municipal waste. Brook A.C. Motors are winning praise in every industry for dependable service and overall economy. They can save for you! Warehouses, Sales Representatives, Dealers throughout the country. Send for literature.

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New Product Briefs (Continued)

Knock-Down Gantry Frame

A-20 A new line of patented "knock-down" type "Budgit" Gantry "A" Frames in 1 and 2 ton capacities has been

announced by **Shaw-Box Crane & Hoist Division of Manning, Maxwell & Moore, Inc.,** Muskegon, Michigan.

Each unit comes in a shipping carton 8" x 11" x 120", is compact, easy to carry, easy to assemble and easy to store. No special tools are required and two men can easily assemble and erect either model in less than an hour.

These new "A" frames, when equipped with a hoisting unit, make a sturdy, mobile lifting device for handling loads up to their rated capacity. The floor is their track, and because their movement is not confined to overhead supports or rails, they can be used anywhere lifting service is required. When desired, the units can be dismantled and stored in a convenient place.

Lubrication System

A-21 Fully automatic and electrically operated, two new centralized lubrication systems — "Electro-Luber" — have been introduced by the **Lincoln Engineering Company,** 5702-24 Natural Bridge Ave., St. Louis 20, Mo. The systems are designed to provide high or low pressure centralized power lubrication for all industrial machinery.

"Electro-Lubers" are compact and highly efficient in supplying oil or grease to banks of injectors in a centralized lubrication system. The operation is entirely electrical and 100% automatic.

"Electro-Luber Systems" are especially suited for service on individual

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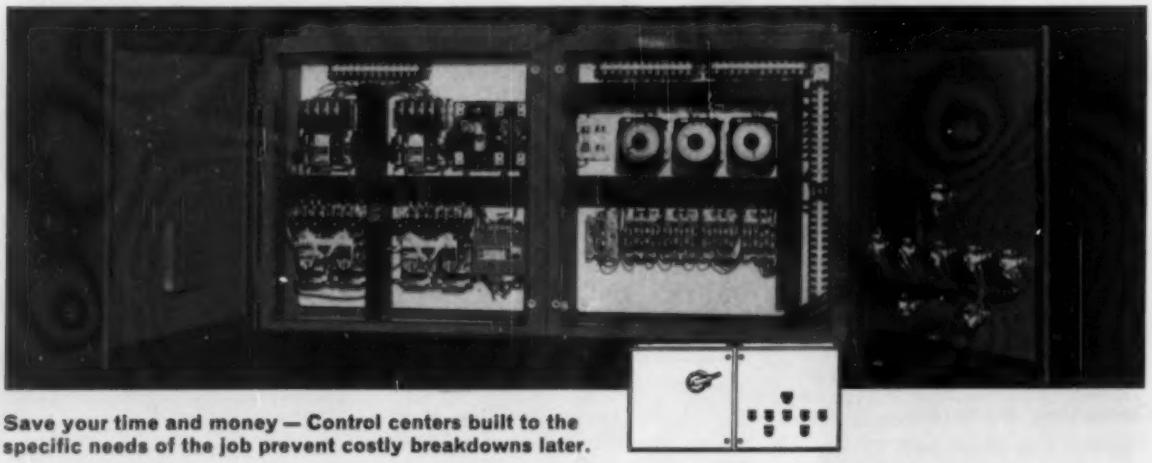
Custom-built from the best components...



Save your time and money — Control centers built to the specific needs of the job prevent costly breakdowns later.

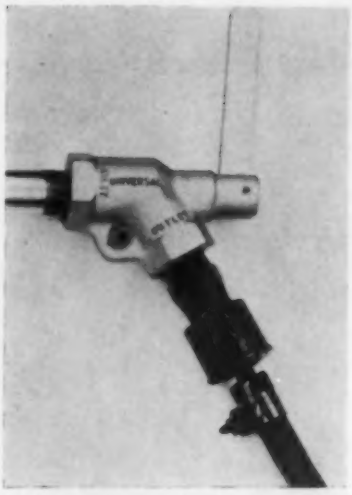
The Thomas B. Combs Co. has designed and built many control panels like the one above. Specializing in quick deliveries, we invite your problems and prints for complete estimates. Built from the best components available, Combs Panels are superior in every detail of construction. Write or phone for full information to:

THOMAS B. COMBS COMPANY
Custom Installations for 20 Years
1823 GORDON ROAD, S. W., ATLANTA 10, GEORGIA — PHONE PLAZA 8-5516

machines, because they become an integral part, making self-lubrication a part of the machine's normal operation.

One feature of these new systems is the safety shut-off that operates automatically if the pump runs dry or a supply line breaks. Various types of alarm devices, such as lights, buzzers, bells, etc., can be installed to call attention to the situation.

"Electro-Luber" pumps weigh 65 lb and can be mounted in less than one-half square foot of space. Two model pumps, 1000 psi and 2900 psi maximum pressure, are available. Powered by a ¼ hp motor, "Electro-Luber" will lubricate up to 1000 bearings in seconds. Bulletin 815 gives details.



Quick Opening Air Service Valve

A-22 A steel air service valve is now available for all plant air service lines from **The Rutherford Co., Inc.,** Box 19364, Houston, Texas.

Positive shutoff is accomplished by means of a spring loaded, long lasting rubber plug. This plug gives the valve the name of a "Stopple" valve. With no wearing such as occurs in a metal seated valve, the maintenance of this unit is reduced to a minimum.

The position of the handle indicates whether the valve is open or closed. An automatic bleed prevents accidents due to disconnecting the tool hose under pressure.

In a closed position the valve plug is held in place by means of line pressure and spring load. When closed the valve handle is down and the hollow stem provides an automatic bleed of the tool hose to atmosphere. When the handle is raised to an upright position the stem pushes the plug off its seat, allowing full-flow through the valve. When open the hollow stem is pressed against the rubber preventing bleed out.

Valves are available only with cadmium plated steel bodies and ¾" NPT outlets. Inlets may be either ¾" or 1" NPT.

Special Service Pumps

A-23 Tripod mounted vertical centrifugal process pumps with stainless steel or other corrosive resistant metal liquid end or with the Goulds-Pfaudler glassed pump liquid end have been announced by **Goulds Pumps, Inc.,** 49 Black Brook Rd., Seneca Falls, New York.

With stainless steel or other resistant metal end, the pump is designated Fig. 3181 and is designed

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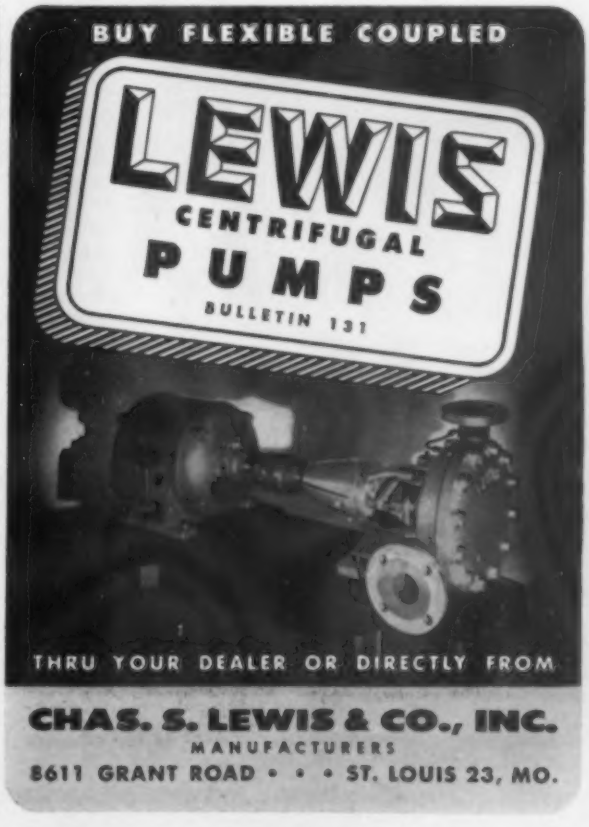

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SOWICO

New Products (Contd.)

primarily for two special and unusually difficult services; the handling of highly volatile, inflammable, toxic, explosive, or other dangerous liquids where it is necessary that the pumpage be completely isolated from the atmosphere; or pumping liquids at extremely low or high temperatures (—320 F to +550 F) where it is essential that the liquid end of the pump be well insulated from the bearings, mechanical seals, driver and free to contract or expand without binding and distortion.

Goulds Fig. 3182 vertical process pumps with Goulds-Pfaulder glassed pump liquid end are designed for use where the liquid to be handled is of highly corrosive nature or where non-adherence of product or no metal contamination is required.

Fig. 3181 pumps are available in nine sizes from ¾" to 3" discharge and capacities to 800 gpm, heads to 300 ft.

In the Fig. 3182 all parts of the pump which come in contact with the pumpage are glassed. The glass is fused to the metal to form a tough, highly corrosion resistant material.

Flow Transmitter

A-24 Entirely mechanically frictionless and liquid-free, a new Flow Transmitter, the Model 245, is now available from **The Hays Corp.**, Michigan City, Ind. for measuring flow, liquid level or any other variable which is a function of differential pressure.

It has no torque tubes, stuffing boxes, knife edges or bearings. Transmitter is of the bellows-actuated type — the differential transformer core moves directly with the bellows. Liquid-free (no mercury is used), the only sensing unit is the single element bellows.

Available in standard industrial ranges from 20 in. to 600 in. water differential, the new transmitter was specifically designed for use with the new Hays Universal Electronic Recorder. Together, these instruments form a system to measure, indicate, and/or record differential pressure.

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Write for photo, data

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100 to 1000 KVA for CASH
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CLASSIFIED RATES

$16 per column inch

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Training Programs

(*Starts on Page* 18)

an individual through the training program was relatively simple. The new trainees were assigned to an occupation designated as Training — Wiring and/or Assembly. If progress on this occupation was satisfactory, the rate was increased periodically by predetermined steps until a new occupation was attained, known as Advanced Training — Wiring and Assembly. Promotion to Advanced Training indicated that the em-

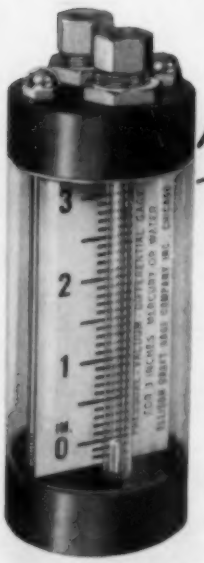
ployee was capable of learning the application of basic techniques to several different or more complex lines of products. As the transfer of the business from Schenectady progressed, and areas of work were set up under the jurisdiction of foremen, employees who had reached Advanced Training status were relocated from the Training Center to a specific foreman's area, although they were not assigned a regular occupation until their advanced training assignment had been completed.

The Training Center continued on a formal basis until about the middle of March, 1955, or approximately 6 months from the start of factory operations. By that time all the lines of products, together with their contributing services, had been transferred, and Waynesboro, Virginia had actually become the General Electric Company headquarters for Specialty Control equipment.

By that time also, a separate physical training location at the plant was no longer available because of the completion of the building and the allocation of space in accordance with the plant layout. A large number of employees had received the benefit of both basic and product instruction. Although hiring was expected to continue (and did continue) at a rapid pace throughout the remainder of 1955, it was decided that since approximately 60 employees for assembling and wiring had been trained, there was no further need for the central Training Center in a separate location. The Center was therefore discontinued as a physical entity, on-the-job training was substituted for it, and the training supervisors were returned to their regular assignments or appointed as foremen.

Although the physical Center itself was dissolved and the instructors were given regular assignments, the occupation, Training — Wiring and/or Assembly, was retained and the over-all training arrangement was maintained. It is, therefore, still possible for a completely inexperienced but trainable candidate to be hired as an Assembly and Wiring Trainee and to receive training on-the-job until sufficient proficiency has been attained to be assigned to a regular occupation. In fact, all inexperienced employees hired for assembly and wiring work are still first assigned to this occupation, although they are assigned physically and organizationally to the foreman in charge of the area where the job opening exists. The foreman observes the work of such individuals and at the appropriate time transfers them to their regular occupation.

We feel sure that the use of a Training Center and the occupational classification and procedures associated with it, did a great deal to enable us to train quickly enough employees for assembly and wiring work. We also feel that it was done more completely and more quickly in this way than it could have been done if each foreman had performed his own on-the-job training.



ELLISON Miniature Draft Gage

HAS STAMINA, ACCURACY OF LARGE GAGES. FOR PRESSURE, VACUUM, DIFFERENTIAL READINGS

Available in ranges of 0" to 3" mercury or water, 0" to 40" of water using mercury, also 0 to 24 oz. using mercury. Dia. 2", height 5⅝", weight 9½ oz. Heavy wall glass indicating tube with straight uniform bore, protected by transparent housing. Highly visible scale. Drain plug screw on side of reservoir. Nickel plated steel fittings. Easily disassembled for thorough cleaning. Modestly priced. Should be carried in all service engineers' kits or for use wherever accurate readings are required. Send for Bulletin 217.

MODEL P-1 SINCE 1896

ELLISON DRAFT GAGE CO.

554 W. Monroe St., Chicago 6, Ill.

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LOOK FOR QUALITY

in your hot water generator... look to FINNIGAN

Finnigan Hot Water Generators are engineered to give you large quantities of hot water for low operating cost. The finest materials, creative skill and quality construction assure efficient performance . . . "Fabricated by Finnigan" assures quality. Finnigan builds hot water generators to your specifications. Call, wire or write today for complete information with no obligation to you.

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How Copes-Vulcan control systems boost power plant efficiency

Copes-Vulcan puts combustion control at operator's finger tips

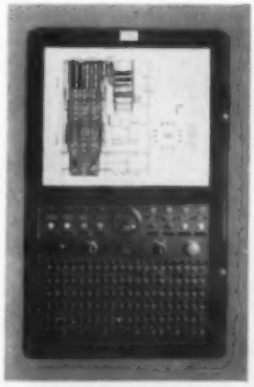
Equipped with easy-to-read recorders and control stations, this compact Copes-Vulcan panel centralizes operator control and simplifies boiler operation. This modern system features circuit simplicity with independent control loops on air flow, fuel loading and furnace draft. Drive units assure accurate positioning and fast response, and eliminate the need for interconnecting control loops.

A custom installation . . . a continuing service

Copes-Vulcan Combustion Control is just part of an integrated boiler control system for regulating feed water, boiler steam temperature and boiler cleaning.

Whether furnished in individual units or integrated into a single system, each installation is tailored to meet specific requirements of generating capacity, load range and fuel. Copes-Vulcan supplies skilled service, when needed, for the life of the installation.

Write for Bulletin 1032 showing a Copes-Vulcan control system working at a showcase generating plant.



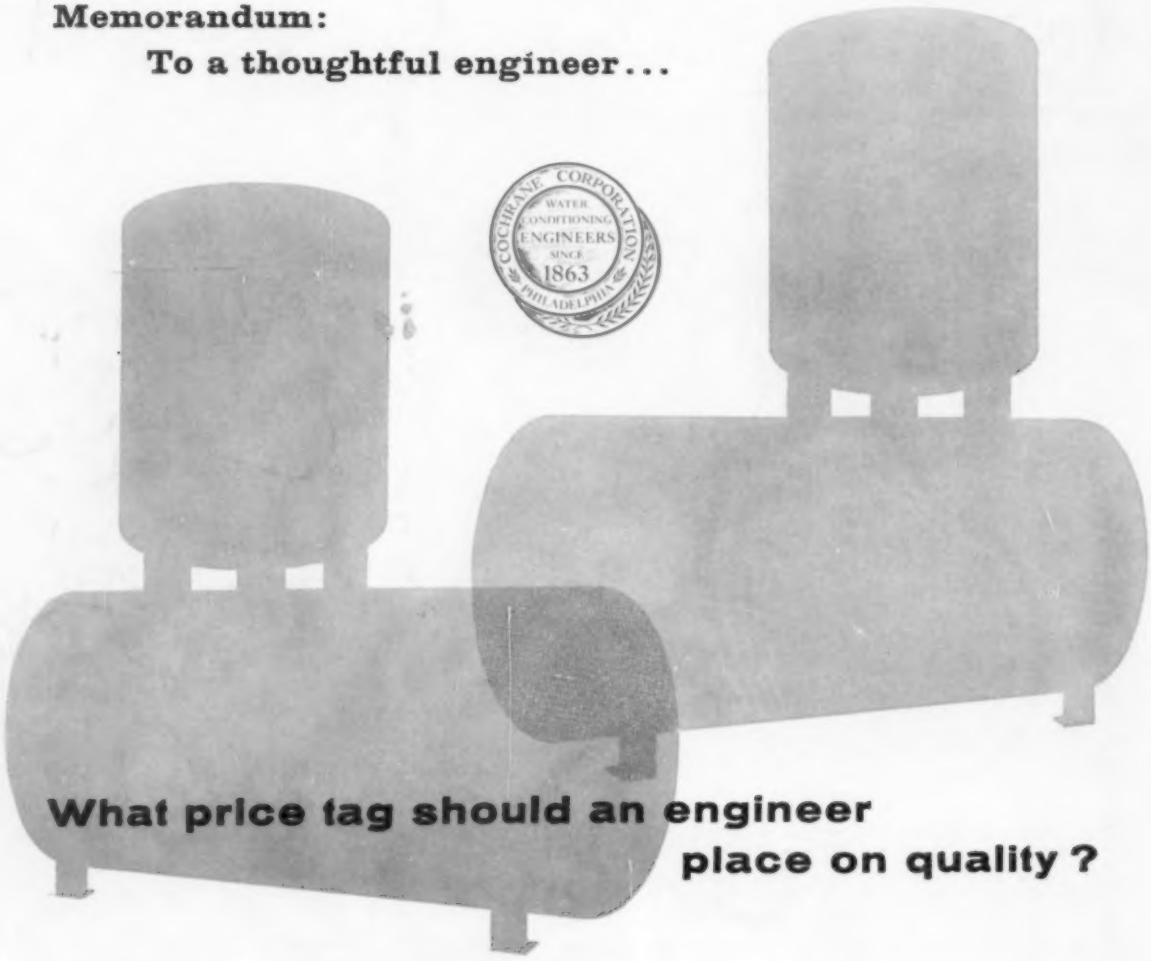
Precision boiler cleaning with Copes-Vulcan Selective-Sequence or Automatic-Sequential soot blowing systems. Space-saving panel permits easy monitoring, flexible programing . . . assures thorough cleaning with less steam and/or air. Write for Bulletin 1029.

Desuperheater improves temperature control. New Variable-Orifice Desuperheater* holds reduced steam temperature constant only 20° downstream from desuperheater outlet, even over a 50-to-1 load range. Write for Bulletin 1037. *Patent applied for

Copes-Vulcan Division
BLAW-KNOX COMPANY
Erie 4, Pennsylvania

Memorandum:

To a thoughtful engineer...



What price tag should an engineer place on quality?

These two medium sized deaerators look alike. We designed both. They have the same outlet capacity, carry similar guarantees and meet the ASME code. But one costs $2000 more than the other.

Which is the better buy?

Obviously, you would want to know more about each unit in order to make a sound decision. Construction to ASME standards and basic guarantees are but part of the quality story. The higher priced unit, for example, has far heavier shell plate, more tray area and spilling edge, superior shell reinforcement, stainless instead of carbon steel baffle, anti-flash downtake. All of these features, we have found, are important to continued top performance.

As one of the world's largest and most experienced manufacturers of deaerators, we believe we know which unit is the better buy. Extra margins of strength and capacity—wisely selected—are not luxuries but sound investments that eliminate downtime and expensive field repairs.

That is why we recommend *quality*, and why thoughtful engineers insist on *quality*. If you are considering the purchase of deaerating equipment we are prepared to help you evaluate *all* the features that mean *true economy* in service. Ask for Bulletin 4650 on the "Why and How of Deaeration"

Write for these five bulletins on Deaeration—the problem, types of deaerators and applications.

Cochrane CORPORATION
3110 N. 17TH STREET, PHILADELPHIA 32, PENNA.

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Representatives in thirty-two principal cities in U.S., Hawaii, Puerto Rico; also Havana, Cuba; Paris, France; La Spezia, Italy; Mexico City, Mexico; Caracas, Venezuela; Santiago, Chile.

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Custom built carbon steel and alloy products.

Demineralizers • Zeolite Softeners • Hot Process Softeners • Hot Lime Zeolite Softeners • Dealkalizers • Reactors • Deaerators • Pressure Filters
Continuous Blowoff Systems • Condensate Return Systems • Steam Specialties